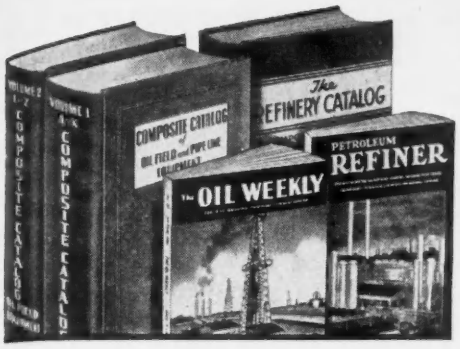

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PETROLEUM REFINER and The REFINERY CATALOG for the refining-natural gasoline industry

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THE CHANGING Panorama

Personnel Effects of Drilling Unit Change

PETROLEUM engineers, drilling foremen and drillers were variously affected in the recent disposition by two major oil companies in California of the drilling departments. The sale of these departments to private contracting firms, only recently organized, was reported in THE OIL WEEKLY of January 20, 1947. The engineering departments of the two companies were least affected, with petroleum engineers either being transferred to duties in the production and other departments, or assigned to handle similar duties as before, only now acting as liaison engineers between the company and the drilling contracting firms.

Santa Fe Drilling Company, a new concern organized by former employes of Union Oil Company, in acquiring the company's drilling equipment, also took with them three engineers, one petroleum engineer, one mechanical engineer and one production engineer. In addition, there were 14 drilling foremen and 37 drillers, together with other field and labor personnel normally connected with drilling operations. Petroleum engineers remaining with the company were not affected adversely by the move to dispose of the drilling department. Some were assigned to petroleum engineering work, acting in liaison with the contractors, while other engineers were assigned to other related duties and engineering work.

Continental Oil Company, in disposing of drilling equipment to the newly-formed firm of Bell and Burden, shifted its drilling engineering personnel into the production engineering department, a move that caused no difficulties inasmuch as the two departments had been more or less interwoven anyway. One mud engineer transferred to the new company, as did approximately 85 pushers and drillers, together with other field personnel directly connected with drilling operations. With the exception of several persons in the accounting department, some of whom were transferred to the Ponca City, Okla., headquarters of the company, and three who were discharged, other personnel were not seriously affected by the disposal of the drilling department.

Implementing Law Needed in Brazil

AS YET no law has been passed in Brazil implementing a change in the Brazilian constitution under which outside capital or companies can engage in the oil business on the same basis as local companies.

Up until the change in the constitution, the majority of the stock of a company engaging in the business of discovering and developing oil reserves in Brazil, had to be owned by Brazilians. The result of this constitutional provision, which had been implemented by a law or decree, was that no oil company outside of Brazil could enter the country. Consequently the Brazilian government itself undertook an exploration campaign which cost several million dollars. Most of the exploratory work was disappointing although oil was discovered in commercial quantities in the coastal area near Salvador. However, total output from the four small fields in the area is less than 100 barrels a day.

When the change in the constitution shall have been implemented by petroleum laws it is likely that more than one foreign oil company will be interested in carrying on work in Brazil, provided that the provisions of the implementing law are regarded as favorable to such ventures.

* * *

The expected oil volume to be added in the 10-year period from 1940 to 1950 is greater than the entire petroleum-industry production in 1921, when oil already was one of our important industries.
—API NEWSNOTES

The Worry About High-Income Men

"AMERICA was built by men willing to take a chance and invest in small businesses which grew into big ones.

"But today it's a different story. The little guy with big ideas can't get people who have money to invest to take a chance on him. Because of huge taxes, the odds are stacked against the investor in new products. And without new investment — continuous investment — everything bogs down.

"It's up to us to see that the government cuts down spending and reduces taxes NOW."

This is the conclusion of a pamphlet entitled "How Much Government Can You Afford?" recently issued by the National Association of Manufacturers, a pamphlet well worth reading. Readers particularly welcome are those who might have been taken in by some recent AFL newspaper advertising which attacked NAM.

Here are some other interesting facts from the pamphlet:

In 15 minutes the government spends $1 million of *your* money.

There are nearly two and a half times as many federal employes on *your* payroll as there were in 1939, not counting those in the armed forces. The administration would like the federal government to spend four times what it spent in 1939.

Paper work in connection with veterans benefits is costing $200 a year per veteran.

Nobody feels sorry for the man who makes $50,000 a year and has to pay half of it for taxes, but what if this high income man is not able to spend some of his money for the tools and machines we need on our jobs? What if he decides he won't take a chance on investing on some new product or new business? Where are the jobs coming from tomorrow when machines wear out?

THE WEEK'S NEWS

PETROLEUM operators in the West and Southwest will find their freight bills cut as a result of a Supreme Court decision upholding an ICC order for a ten percent cut in class rates in those areas. Page 27.

NPC Committees Named—Membership of committees to make investigations voted at the last meeting of the National Petroleum Council has been announced by NPC Chairman Hallanan. Page 28.

Labor Law and the Veto—Labor legislation is being worked out by House and Senate conferees facing the big questions of whether they can develop a bill which will be signed by the President or can be passed over his veto.

Refinery Capacity Needed—Interior Secretary Krug urged the Labor Department to use every facility in settling refinery strikes because next winter's oil supply is currently at stake. Page 25.

Texas Allowable Upped—The Texas Railroad Commission has set the state's allowable for the months of June, July and August at an increase over the May figure. Page 27.

Natural Resources Probe—A Senate Public Lands subcommittee has opened a special investigation of natural resources and their development for the promotion of the national defense. Page 27.

Naval Reserve Funds—No change in contract with Standard Oil Company of California at Elk Hills is contemplated, a House Appropriations Committee was told last week. Page 26.

Production Sets Record—United States crude output topped the 5-million-barrel mark for the week ended May 10 for the first time in history. Page 73.

Tanker Rate Cut Asked—Users of government tankers urge a reduction in Maritime Commission voyage rates and amendment of the Ship Sales Act to permit bareboat chartering. Page 28.

OGD Only Salvation—Summing up elements involved in the petroleum supply situation, NPC Chairman Walter S. Hallanan warns Oil and Gas Division is the only government agency equipped to deal with the oil problem on an over-all basis. Page 26.

"Lobbyists" Register—Practically all members of the oil and gas industries who will be active with respect to legislation now have registered under the Lobbying Act.

Avgas Plant Sold—War Assets Administration reports the sale of the eleventh surplus aviation gasoline refinery, with 17 more to be disposed of.

Would Apply Leasing Law—A Senate committee has approved legislation extending the Mineral Leasing Act and Interior Department administration to lands acquired by the federal government, despite opposition of the Department of Agriculture.

Secondary Recovery Study—Following the OGD-Compact Commission conference on secondary recovery problems, a committee was named to study data and promote a plan for correlating the efforts of various groups. Story below.

Group to Digest Secondary Recovery Data and Recommend Further Action

Pennsylvania Grade producers are in the forefront of the secondary-recovery movement, with only spotty efforts under way in other sections of the country, and a vast program of research, experimentation and developments must be undertaken if the industry is to bring out any substantial part of the 100 billion barrels of reserves not productible with present methods, it was brought out last week at the Secondary Recovery Forum staged jointly by the Oil and Gas Division and the Interstate Oil Company Commission in Washington.

The joint meeting was the first of two, the second being a conference the following day between a special committee of the Compact Commission, National Stripper Well Association and Independent Petroleum Association of America with members of the Army-Navy Petroleum Board at which the latter's assistance, technical and scientific, was requested in the industry's study of secondary recovery methods.

A score of the approximately 70 industry representatives, state officials and government experts who attended, discussed various phases of the problems, developing that while comprehensive programs have been undertaken only in the Pennsylvania Grade area, officials and operators in many states are concerned over the situation and have factual studies and laboratory work under way which eventually will develop into field programs.

It developed that the two major requisites to a nationwide attack on the secondary recovery problem are an educational campaign to enlighten state officials, legislatures and the general public as to the need and advantages of secondary recovery and the training of men to do the work.

A committee will digest the information developed in the forum and make recommendations for further action and fix a place and date for another meeting. The committee consists of E. G. Dahlgren of the Compact Commission, Dr. Fancher, Richard V. Hughes of the Pennsylvania Grade Crude Oil Association, D. B. Taliaferro of the Bureau of Mines and S. T. Yuster of the Pennsylvania State College.

OGD Director Max W. Ball and Compact Commission Vice Chairman Clarence T. Smith jointly presided over the meeting, which Ball explained in his opening remarks was an outgrowth of a suggestion from the Bureau of Mines that the NPC might appoint an advisory committee on oil and gas research. Study of that suggestion, Ball said, developed that 20 industry committees were already active, state officials were doing research, laboratory and field work, and the Compact Commission was going into the subject in a big way, the outcome being that the OGD and commission agreed to sponsor a meeting jointly to set up such a committee on an all-industry basis.

In a report Smith outlined the work which the Compact Commission has done and the program which has been tentatively laid out by its recently-created Secondary Recovery Division, for which, he said, it is still seeking a man qualified to serve as assistant director.

"It is our sincere desire to assist in the coordinating of secondary recovery programs throughout the nation looking toward their more effective development and the prevention of overlapping of activities," Smith said. "We have no intention or desire to replace any of these activities."

C. C. Anderson described the work under way in the Bureau of Mines, admitting that it would be severely cut back if the Senate does not restore funds, cut out of the Interior Department appropriation bill by the House, amounting to some $120,000, or nearly one-third of the amount requested.

Anderson's explanation brought from industry representatives expression of a determination to fight for both the bureau and OGD appropriations, and copies of several of the papers read will be sent to members of the Senate Appropriations Committee with other data demonstrating the desirability of continuing their activities.

Representing the API Southwestern

17,490 New Depth

Superior Oil Company of California's Weller 51-11, NW NW NE 11-8n-12w, five miles north of Fort Cobb in Caddo County, Oklahoma, the world's deepest well, was drilling below 17,490 feet on May 15, and company officials reported all work proceeding smoothly.

The test made approximately 64 feet of hole in 48 hours.

District, Division of Production, George H. Fancher of the University of Texas, read a letter from Paul D. Torrey, chairman of the subcommittee on secondary recovery, recommending the gathering of information on such activities and that the Compact Commission take action to promote the adoption of legislation to permit unitization of fields to increase recovery. Torrey pointed out that some very successful operations would not have been feasible had they not been unitized, and suggested that the states should carry on studies of oil fields individually, while the Bureau of Mines gathered statistics on the subject generally, and that it would be helpful if the commission and OGD reviewed periodically all investigations in progress.

Torrey said estimated recoverable reserves of Texas may be doubled if a practical method is developed for secondary recovery from low permeability limestone reservoirs, and declared that enactment of legislation to limit Federal Power Commission authority would be a "true measure" of conservation through removing the reluctance of oil operators to organize programs for the conservation of natural gas.

Getting into the Pennsylvania Grade area, the meeting was told by J. P. Jones, as representative of the Independent Petroleum Association's secondary recovery committee that the question of whether secondary oil reserves will be produced is almost entirely dependent upon a favorable economy since the technology is well advanced and there is no lack of essential research or engineering data that would prevent nationwide secondary recovery operations so long as the selling price of crude is at a favorable level.

Speaking also for the Pennsylvania Grade Crude Oil Association, Jones said that two-thirds of the oil brought out of that area is by secondary recovery means.

For the same association, D. T. Andrus, Pennsylvania representative on the Compact Commission, reported that the Bradford area had a primary production of 250 million barrels, now has produced about the same amount by secondary recovery and may produce another 100 million barrels before the field is worked out under present methods, but at least 700 million barrels will be left underground unless new methods of recovery are worked out. Under the same formula, the whole Pennsylvania Grade region has a possible additional recovery of 5 billion barrels after presently recoverable oil is worked out. Because of the great amount of oil which could be recovered if practical methods could be developed—out of the 100 billion barrels not recoverable throughout the country—Andrus said the government should exhaust the possibilities of secondary recovery research before embarking on a program of shale and synthetic oils.

The state and industry are spending $100,000 annually on water-flood research, and experiments with detergents and oil releasing bacteria are being carried on at Pennsylvania State College, it was reported by Richard V. Hughes, also representing the association. Basic problems, he said, are to get more of the right kind of water into sands still containing recoverable oil and to prevent needless water throughput in sands which have been depleted.

At the State College, Dr. S. T. Yuster, chief of the Petroleum and Natural Gas Engineering Division, reported, quick methods for core analysis have been developed and work is going on on colloidal dispersion to provide selective plugging in depleted strata in sands which have a heterogeneous permeability.

Robert B. Bossler of Brundred Oil Corporation, declared that cost of development must be met and some chance of profit afforded before expensive recovery projects will be adopted. He suggested that the government might make incentive payments for conservation practices to promote secondary recovery. The only other man to suggest a government subsidy, however, was J. N. Thelon of the Montana Stripper Well Association.

About one-eighth of the Illinois Basin area is being produced under conservation methods, most of it by gas injection methods but in late years an increasing acreage by water flood, according to Alfred H. Bell of the State Geological Survey. Currently, he said, the industry is working on proposed legislation for compulsory unitization for conservation purposes.

Oklahoma's compulsory unitization law eventually may make secondary recovery unnecessary, it was declared by Walter T. Pound of the State Corporation Commission. C. P. Dimit of Phillips Petroleum Company, stated in a letter that unitization in the South Burbank field is expected to develop 18 million barrels, or 87 percent more oil than would be recovered by normal methods, while in the North Burbank field it is expected to develop 39 million barrels, or 18.5 percent more.

A survey made by Arkansas authorities shows that the recovery from the state's fields could be increased by 100 percent through secondary recovery, it was reported by Alec Crowell of Texas Eastern Transmission Corporation. A major problem, he said, is the removal of vacuum from the older fields, particularly Smackover, and legislation has been recommended prohibiting the use of vacuum.

California's fields do not lend themselves to the types of secondary recovery used in the East, it was declared by H. C. Miller of the San Francisco office of the Bureau of Mines, because of density and loose character of the sands and the viscosity of the oil in many fields, and little has been done in that direction although ineffective experiments have been made in increasing the recovery from the tar sands through the application of heat and more successful efforts have been made in obtaining oil from the bituminous sands.

The three major fields for basic research are capillary forces, elevation of reservoir temperatures and precipitation of paraffin, it was suggested by Lloyd E. Elkins of the West Pampa Repressuring Association.

The areas which present the greatest problems, he said, are West Texas and the Panhandle, the Arbuckle limestone in Kansas, the Rocky Moutains and the Gulf Coast.

The allowable for June has been raised 60,000 barrels and Texas production now is at all-time high levels, it was stated by William J. Murray, Jr., of the Texas Railroad Commission, yet the state is doing little in the way of research in secondary recovery. With the greatest reserves of any of the states, the magnitude of the problem is correspondingly increased, he said.

Quick Settlement of Refinery Strikes Needed to Avoid Winter Oil Shortages

Quick action to settle refinery strikes which have idled 220,000 barrels daily of refinery capacity has been urged upon Secretary of Labor Lewis B. Schwellenbach by Interior Secretary J. A. Krug and members of Congress from the Midwest. Strikes in three plants of The Pure Oil Company and in refineries of Shell Oil Company and Phillips Petroleum Company, on top of the destruction of 100,000 barrels of capacity at Texas City, are adding to the gravity of the outlook for next winter's supplies according to Interior oil experts.

Krug is understood to have told Schwellenbach that the record demand anticipated this year, estimated at 5,700,000 barrels daily, can be met only if every facility of the industry is used to maximum capacity. Many distributors in the Middle West are refusing to accept new customers for heating oils. New diesel oil customers are similarly unwelcome and spot shortages of heavy fuel oils have been plaguing industrial users in the East, he said.

With Latin America already at or close to its maximum efficient rate of production no relief can be had through increased importations from the Caribbean area and only through the uninterrupted operations of every refinery in the country at capacity will it be possible to meet the estimated demand.

* * *

The 64-day strike of about 1400 CIO oil workers at Shell Oil Company's Deer Park refinery, near Houston, was settled Friday. However, it will be several days before the plant is back in full operation.

Terms of the agreement included a cost-of-living raise of 22 cents an hour with the wage increase being effective as of February 16, 1947, and continuing until December 31, 1947, unless reopened after September 30.

A voluntary revocable union check-off of dues was also agreed upon. Some adjustment in classifications and compromises on other points were made.

Materials Shortages Cited by Hallanan As Showing Need to Keep OGD Alive

Only the Oil and Gas Division, of all government agencies interested in petroleum, is in a position to concern itself or equipped to deal with the over-all problem of supply, it was contended last week by National Petroleum Council Chairman Walter S. Hallanan, in supplementing his testimony before a Senate Appropriations subcommittee urging the granting of funds to keep the division alive after June 30.

Warning that the supply situation which is developing will tax the resources and ingenuity of the industry, Hallanan declared it imperative that a central government agency be available to assist, at least in developing the basic facts underlying the elements involved. Those elements, he showed, are many and varied, extending all the way from initial production of crude oil to final distribution of refined products.

Hallanan said that consumption will average 5,700,000 barrels daily this year, as against 5,321,000 daily in 1946, and will reach as high as 5,900,000 barrels daily in the last quarter, with more oil burners, automotive equipment and farm machinery in use than ever before.

With most domestic fields producing at or above their MER, more productive capacity is needed and the industry expects to drill more than 107,000,000 feet in 30,000 wells, limited to that level only by the lack of steel for casing, drill pipe, rigs and drilling tools, but this effort will have little direct effect on supply until well into 1948 and, barring the discovery of some unexpectedly large shallow field, will do no more than maintain our productive capacity at its present rate.

More pipe lines are needed to get oil out of new fields that are not up to maximum efficient capacity and into refineries that are short of crude, but they can't be built because of the lack of steel, he said. More tank cars are urgently needed, both low and high pressure; more refinery capacity, to offset shutdowns because of lack of crude or by strikes (220,000 barrels daily is currently being lost by strikes), or lost by fire (the Texas City disaster is costing 100,000 barrels daily).

The situation cannot be cured by imports, already running about 450,000 barrels daily, Hallanan said, because the Caribbean area and Mexico already are producing at the maximum efficient rates. Only in the Middle East is there excess capacity in material amounts, but needed oil cannot be moved to England and western Europe because of a shortage of tanker capacity.

"Don't Be Blind"

"The federal government should not be blind to a matter that affects so directly the welfare of so many of its citizens," he said. "It should not be unconcerned over the possibility that homes may go unheated, industrial plants may be idle, hospitals may be inadequately heated, and the military and naval services may be hampered for lack of adequate supplies of petroleum products."

Because these are matters of national security, the OGD-NPC set-up is not a case of the government serving the industry but of the industry serving the government in an effort to keep the economy running smoothly. If the government sought to employ the technical men and economists serving freely on NPC committees, it would cost many times the $221,000 needed to keep the OGD going, he declared.

Alaskan Exploratory Work Progressing, Congress Told

Exploratory activities of the Navy in Naval Reserve No. 4 in Alaska have been classified by the Navy Department as secret, but indications are that the work is progressing favorably although the first well sunk, at Umiat Mountain, while producing a number of oil shows, did not turn out to be a producer.

Details of the project were disclosed to a House Appropriations Subcommittee by Commodore W. G. Greenman, director of Naval Petroleum Reserves, in an off-the-record discussion. The Navy asked no funds for this project for the coming fiscal year, having received $9,600,000 last year for the entire life of the work, which is to be completed in fiscal 1950.

Appearing before the committee to justify estimates for his office, Greenman reported that there will be no change in the contract with Standard Oil Company of California for maintenance of Naval Reserve No. 1 (Elk Hills).

The company last year sought revision of its contract to relieve it from bearing the heavily increased expenses resulting from the cutting back of production to a maximum of 8450 barrels daily, the output estimated to be required to keep the reserve in a state of readiness. The company's proposal was not acceptable to the department which countered with a proposal which the company refused, and hearings before the House Naval Affairs Committee failed to develop any basis for agreement. The whole matter is dead, Greenman said, and the original contract will stand.

The Navy appropriation bill for the coming fiscal year to be taken up by the House this week, carries a cut of $22,000 from the amount requested by the department but only $10,000 less than provided for the current year. Half of the $12,000 increase over this year was to have been used to meet additional costs in work done for the department by the Interior Department and the other $6000 was for payment of services of expert consulting geologists and engineers primarily to enable Harry A. Stolz of Stanley & Stolz, former naval inspector, to continue as Navy member of the engineering committee.

Recycling Plant Effort Described at Scout Meet

The Louisiana Conservation Department is striving for additional recycling plants, Joseph L. McHugh, commissioner, told delegates to the annual meeting of the National Oil Scouts & Landmen's Association in New Orleans last week.

McHugh said that the foremost plants in Louisiana at present were at Erath, Vermilion Parish, and at Lake St. John. The latter is now under construction. The gas-oil ratio in Louisiana has declined from 2070-1 to 470-1 since 1941 while oil and gas production increased some 35 percent. At present some 217 million cubic feet of gas is being flared in Louisiana.

Other speakers on the program were R. G. Rice, vice president, and Ralph Graham, chief geologist, Tennessee Gas & Transmission Company.

Mother Hubbard Suit Plea Finally Filed by Justice

The Department of Justice went into the District of Columbia Federal Court Friday with another move in the "Mother Hubbard" suit, finally filing an objection to the interrogatory submitted by Sun Oil Company last July after having obtained several extensions of time in which to answer.

Next step in the case, it was said, would be for Sun to file an answer to the department's objection possibly this week although the company in turn might ask for more time in which to consider its move.

Indicating that oil cases are looming larger in departmental thinking the staff of J. Watson Snyder, special assistant to the Attorney General, who has been handling the case, has been increased by the addition of four lawyers but department officials would not say whether this presages the filing of the several suits into which Attorney General Clark sometime ago indicated the "Mother Hubbard" case would be split.

Penn Crude Upped

Effective May 16, Pennsylvania grade crudes were again increased in price by 14 cents a barrel. The new price posted by Joseph Seep Purchasing Agency of South Penn Oil Company for Bradford-Allegany crudes is $4.05 per barrel, compared with the previous posting of $3.91 a barrel.

Similar increases were posted in other areas producing Pennsylvania grade crude. New prices include those of $3.84 per barrel in Southwest Pennsylvania and Eureka Pipe Line systems and $3.80 per barrel in Buckeye Pipe Line Company lines.

East Texas Reports

Well status reports on every well in the East Texas field must be filed by July 1, 1947, the Texas Railroad Commission ordered last week. Failure of any operator to comply will result in severance of his pipe line connection.

High Allowable Fixed for Texas Fields For Period Ending Next September 1

The Texas Railroad Commission last week issued a new proration order effective for the months of June, July and August—a departure from the old plan of monthly orders—intended to stabilize allowables.

The June calendar-day allowable calls for production of 2,480,699 barrels, 63,814 barrels above May. Of this increase, 32,321 barrels went to West Texas, 15,541 barrels to Gulf Coast District 3; 6997 barrels to District 4, and 5405 barrels to District 2. The East Texas field was cut 3818 barrels daily.

The new order provides for 22 producing days for East Texas, one less than May, 21 producing days for West Texas, an increase of one. The Panhandle is still exempt from shutdowns, and the other fields which are not exempt are permitted to produce 27 days.

The same shutdown program is provided for July and August, but because these months have one more day, the calendar day allowable is reduced to 2,420,095 barrels. This cuts the East Texas field 14,345 barrels per day, but 17,555 barrels is added to West Texas.

The Commission announced that the new MER figures would not be finally compiled until June and therefore it will be impossible to include all of them in the June allowables as most operators desired. However, overall changes are so small that commission engineers thought there would be little difference in the total state allowable.

If increases for particular fields are necessary, the Commission will call hearings from time to time to make adjustments. Many of the operators at the Corpus Christi hearing were doubtful that the 90-day order was practical from this standpoint. They were interested primarily in having higher rates of production included for those fields which have higher maximum efficient rates as indicated by the hearings.

Bottom-hole pressure in the East Texas field dropped 5.56 pounds in April.

Humble announced that it has completed its program to move 50,000 barrels of oil daily by tank car from its Midland loading rack. The Company asked for allowables sufficiently high to provide this oil. Magnolia likewise announced a tank car program which will handle 10,000 barrels daily from the same area.

Maston Nixon, representing Southern Minerals Corporation, urged the Commission to fix allowables at the MER for each field if the oil could be moved out. He declared that the domestic market will absorb all the oil that can be produced efficiently, and pointed out that it will be supplanted by imported crude if it is not produced here.

The next hearing will be held in Austin in August.

Louisiana Bids Low

An offering of 32 parcels of federal land in eleven oil and gas fields in northern Louisiana aggregating 1210 acres brought bids last week on only eight parcels and offers of bonuses of $1 per acre on two parcels in the Monroe gas field and $5 on lands in the Bethany gas fields, Rodessa and Pine Island oil fields and the Red River-De Soto oil and gas fields.

Since there was no competition for the parcels bids upon and no offers for the other lands, the Bureau of Land Management is expected to reject the proposals and lay the whole matter aside for possible re-offer at a later date.

Kentucky Meeting

The annual meeting of the Kentucky Oil & Gas Association will be held at the French Lick Hotel, French Lick, Indiana, June 26-27, J. C. Preston, executive secretary, has announced.

Crude Oil Production in the United States

(Estimates compiled by THE OIL WEEKLY. All figures indicate daily averages in barrels.)

STATE OR DISTRICT	PRODUCTION IN WEEK ENDED May 17	May 10
Alabama	1,100	700
Arkansas	74,750	74,500
California	913,600	911,300
Colorado	40,000	37,700
Florida	475	460
Illinois	186,300	189,400
Indiana	18,100	18,200
Kansas	286,450	278,650
Kentucky	25,800	25,000
Louisiana	413,750	413,300
North Louisiana	97,750	97,300
South Louisiana	316,000	316,000
Michigan	41,000	40,000
Mississippi	89,300	91,050
Missouri	100	100
Montana	23,100	22,500
Nebraska	600	600
New Mexico	105,850	105,850
New York	12,900	13,550
Ohio	8,800	9,000
Oklahoma	385,750	385,700
Pennsylvania	34,100	35,700
Tennessee	25	25
Texas	2,226,850	2,226,850
Tex. R. R. Comm. Districts:		
Dist. 1—South Central	21,100	21,100
Dist. 2—Middle Gulf Coast	159,160	159,160
Dist. 3—Upper Gulf Coast	485,170	485,170
Dist. 4—Lower Gulf-S.W.	243,420	243,420
Dist. 5—East Central	38,360	38,360
Dist. 6—East Texas Field	338,000	338,000
Dist. 6—Rest of Northeast	112,500	112,500
Dist. 7-B—North Central	38,200	38,200
Dist. 7-C—West Central	36,790	36,790
Dist. 8—West	530,130	530,130
Dist. 9—North	137,800	137,800
Dist. 10—Panhandle	86,220	86,220
Virginia	200	200
West Virginia	7,800	7,600
Wyoming	113,300	113,750
Total United States	5,010,000	5,001,485

Total stocks foreign and domestic, May 10, as reported by the Bureau of Mines were 236,500,000 barrels.

Slash in Freight Rates Will Affect Oil Industry

The Supreme Court last week ordered a 10 percent slash in commodity freight rates in the Southwestern, Southern and Western Trunk Line territories, and a corresponding increase in the Official territory, leaving unchanged only the rates in the Mountain Pacific territory, affirming an order issued by the Interstate Commerce Commission in 1945.

The court opinion will pave the way for substantial savings in freight charges on pipe, oil-field equipment and other manufactured products used by the industry in the West and Southwest east of the Rocky Mountains, excepting only the states of Montana and New Mexico.

Issuance of the ICC order followed a study of the freight rate situation running over a period of years, aimed at equalizing the unbalanced rate structure built up by the railroads.

The railroads, a number of northern states and industries in Official territory fought the order, the carriers opposing the reductions and the others the increase in Official territory.

The court still has before it, and may act upon next fall, the case instituted by the state of Georgia accusing the railroads of conspiring to restrain industry in the South by a pattern of unfair rates. A special master now is taking evidence in that case, but will not report before the end of the court's current term next month.

Investigation to Include Natural Resources Study

A special investigation to determine how the natural resources of the country can best be developed and utilized to promote national defense and the maintenance of high living standards was opened last week by a special national resources economic subcommittee of the Senate Public Lands Committee.

Basic information regarding presently known reserves of minerals and other natural resources and the operations of the Interior Department in those fields was given by Secretary J. A. Krug, Geological Survey Director W. E. Wrather and Bureau of Mines Director R. R. Sayers.

The hearings are expected to extend over a period of several weeks.

Supreme Court Rules On Recycling Damage Claim

The Supreme Court, by refusing to review a Fifth Circuit Court of Appeals decision in a case involving the Tide Water Associated Oil Company, last week laid down a rule that recycling programs carried out in lands of individuals under an ordinary oil and gas lease do not constitute a breach of any implied contract not to injure the lands.

The case was brought by land owners from whom Tide Water held leases, who contended that the recycling process, which involved withdrawing wet gas and forcing dry gas back into the sands, had ruined a portion of their lands for the production of distillate.

Industry Shortages to be Probed By Committees of Petroleum Council

Various shortage problems which are currently disturbing the oil industry will be probed by committees named by the National Petroleum Council through its Chairman, Walter S. Hallanan.

One of the groups headed by C. P. Parsons, Well Protection Company, Inc., Houston, will study and report on steel shortages which are plaguing all branches of the industry while others will gather data regarding domestic refining capacity, determine availability of domestic crude for increased demand, etc.

New committees named include:

Military and Government Petroleum Requirements: J. F. Drake, Gulf Oil Corporation, Pittsburgh, Chairman; Paul G. Benedum, Hiawatha Oil and Gas Company, Pittsburgh; Bruce K. Brown, Standard Oil Company (Indiana), Chicago; Russell B. Brown, IPAA, Washington; E. DeGolyer, DeGolyer and MacNaughton, Dallas; Fayette B. Dow, National Pertoleum Association, Washington; B. H. Dresser, Hancock Oil Company, Long Beach, Cal.; R. G. Follis, Standard Oil Company of California, San Francisco; J. A. Lentz, Continental Oil Company, Denver; B. L. Majewski, Deep Rock Oil Corporation, Chicago; J. Howard Marshall, Ashland Oil and Refining Company, Ashland, Ky.; Howard Page, Standard Oil Company (New Jersey), New York; W. S. S. Rodgers, The Texas Company, New York; J. L. Taylor, Halliburton Oil Well Cementing Company, Amarillo, Texas; Reese H. Taylor, Union Oil Company of California, Los Angeles; R. G. A. van der Woude, Shell Union Oil Company, New York; H. C. Wiess, Humble Oil and Refining Company, Houston; Ralph T. Zook, The Sloan and Zook Company, Bradford, Pa.

Petroleum Tank Car Steel Requirements: K. S. Adams, Phillips Petroleum Company, Bartlesville, Okla., Chairman; C. R. Musgrave, Phillips Petroleum Company, Bartlesville, Vice Chairman; A. G. Anderson, Socony-Vacuum Oil Company, New York; P. G. Anderson, Lion Oil Company, El Dorado, Ark.; Paul J. Bond, The Pure Oil Company, Chicago; E. E. Brumberg, Quaker State Oil Refining Corporation, Oil City, Pa.; H. E. Coyl, General American Transportation Company, New York; C. F. Dowd, Tide Water Associated Oil Company, New York; H. R. Gillespie, Deep Rock Oil Corporation, Chicago; B. C. Graves, Union Tank Car Company, Chicago; Charles S. Jones, Richfield Oil Corporation, Los Angeles; J. R. Lewallen, Anderson-Prichard Oil Corporation, Oklahoma City; Gilbert J. Mueller, Argo Oil Corporation, Denver; J. R. Parten, Woodley Petroleum Company, Houston; Robert Rogers, Shippers Carline Corporation, New York; Ralph P. Russell, Pennsylvania Railroad, Philadelphia; R. J. Walshe, The Texas Company, New York; W. K. Warren, Warren Petroleum Corporation, Tulsa.

Petroleum Transportation Facilities: B. Brewster Jennings, Socony-Vacuum Oil Company, New York, Chairman; A. D. Carleton, Standard Oil Company of California, San Francisco; L. A. Carlson, Gulf Oil Corporation, Pittsburgh; Lee R. Cowles, Standard Oil Company (Indiana), Chicago; Fayette B. Dow, National Petroleum Association, Washington; W. R. Finney, Standard Oil Company (New Jersey), New York; H. A. Gilbert, Oil Transfer Corporation, New York; B. C. Graves, Union Tank Car Company, Chicago; B. I. Graves, Tide Water Associated Oil Company, New York; Porter L. Howard, Sun Oil Company, Philadelphia; C. H. Kountz, Sinclair Oil Company, New York; S. F. Niness, Leaman Transportation Company, Downington, Pa.; James P. Patterson, Pan American Petroleum and Transport Company, New York; James H. Pipkin, The Texas Company, New York; Clark E. Seargeant, Seargeant Transportation Company, Santa Barbara, Cal.; T. E. Swigart, Shell Pipeline Corporation, Houston; G. C. Taylor, Mississippi Valley Barge Line Company, St. Louis; A. O. Woll, General Petroleum Corporation, Los Angeles.

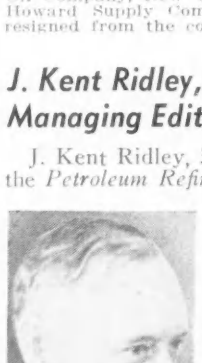
Production and Crude Availability: B. A. Hardey, IPAA, Shreveport, La., Chairman; K. S. Adams, Phillips Petroleum Company, Bartlesville, Okla.; George S. Bays, Stanolind Oil Company, Tulsa; J. S. Bridwell, Bridwell Oil Company, Wichita Falls, Texas; F. S. Bryant, Standard Oil Company of California, San Francisco; Henry M. Dawes, The Pure Oil Company, Chicago; O. D. Donnell, The Ohio Oil Company, Findlay, Ohio; Jake L. Hamon, Cox and Hamon, Dallas; A. Jacobsen, Amerada Petroleum Corporation, New York; J. Sayles Leach, The Texas Company, Houston; John M. Lovejoy, Seaboard Oil Company of Delaware, New York; Frank M. Porter, Mid-Continent Oil and Gas Association, Oklahoma City; E. E. Pyles, Los Angeles; D. T. Ring, Pennsylvania Grade Crude Oil Association, Columbus, Ohio; Charles F. Roeser, Roeser and Pendleton, Fort Worth; R. S. Shannon, Pioneer Oil Corporation, Denver.

Refining Capacity: Robert E. Wilson, Standard Oil Company (Indiana), Chicago, Chairman; T. H. Barton, Lion Oil Company, El Dorado, Ark.; Paul G. Blazer, Ashland Oil and Refining Company, Ashland, Ky.; Stewart P. Coleman, Standard Oil Company of New Jersey, New York; A. P. Frame, Petroleum Advisers, Inc., New York; W. T. Gunn, API, New York; C. L. Henderson, The Vickers Petroleum Company, Wichita, Kan.; D. B. O'Neill, Independent Refiners' Association of California, Los Angeles; G. L. Rowsey, Taylor Refining Company, Taylor, Texas; W. G. Skelly, Skelly Oil Company, Tulsa; C. S. Teitsworth, Socony-Vacuum Oil Company, New York; J. S. Worden, The Texas Company, New York; Gordon Duke, National Council of Independent Petroleum Associations, New York.

Hallanan also announced that the following members have been added to the Committee on Materials Requirements: Claude Lane, Standard Oil Company of California, San Francisco; Herbert Hansen, Superior Oil Company, Houston, and W. H. Braches, Shell Oil Company, New York. Harold E. Howard, Howard Supply Company, Los Angeles, has resigned from the committee.

J. Kent Ridley, Refiner Managing Editor, Dies

J. Kent Ridley, 56, managing editor of the *Petroleum Refiner* and associated with the Gulf Publishing Company for 26 years, died of a heart attack May 12 at his home. He started his career in printing and journalism during high school vacations, and was editor of a successful weekly newspaper in Kirbyville, Texas, when he was 21. During World War I he joined the staff of the *Houston Post*, but left to work for a lumber concern, though he continued as special contributor to the *Post* and was correspondent for a national lumber journal. He was special reporter and feature writer for the *Houston Chronicle* in 1920. In 1921 he became connected with THE OIL WEEKLY. He was editor of the *Petroleum Marketer* for three years, and then became managing editor for both THE OIL WEEKLY and *Petroleum Refiner* until 1944, when he began devoting all his time to the *Refiner*.



J. Kent Ridley

Ray L. Dudley, president of the Gulf Publishing Company, who was in Los Angeles on business, was unable to get to Houston in time for the funeral which was held Wednesday morning, but he wired Mrs. Ridley an expression of his sympathy, and termed Mr. Ridley's death a "terrible loss" to him personally and to the company.

Maritime Commission Asked To Lower Oil Tanker Rates

Lower Maritime Commission voyage tanker rates would result in decreased gasoline and bunker fuel prices to consumers, but regardless of costs continued operation of government tankers under general agency agreements is the only way in which the present abnormal situation can be met, oil company spokesmen testified at hearings before a House Merchant Marine subcommittee.

Industry representatives strongly support the commission's recommendation for extension of authority for a year after June 30, and also urged amendment of the Ship Sales Act to permit the bareboat chartering of tankers.

Captain B. B. Howard, marine operations expert of Standard Oil Company (New Jersey); Almon E. Roth, president of the National Federation of American Shipping, and T. E. Buchanan, general manager of marine operations for The Texas Company, reviewed the situation to show that the area of need for additional tanker capacity is abroad. The industry has purchased 140 tankers since 1941, Roth explained, and now has all needed for American-flag requirements, while Howard estimated that 100 more oil-carriers could be sold to foreign interests if present restrictions on such sales were lifted.

Roth asserted that the $2.85 per ton commission rate for transporting oil from Port Arthur to New York compares with the approximately $2 per ton it costs private operators. Howard suggested a 20 percent cut in commission rates, which he declared could result in a decrease in consumer prices of eight to nine cents a barrel on bunker fuel and one-fourth cent per gallon on gasoline.

Special Probe of Tubular Goods Shortages Is Asked

The House Small Business Committee will be asked by the Texas Independent Producers and Royalty Owners Association to conduct a special hearing devoted entirely to the shortage of tubular goods in the oil industry, H. J. Porter, Houston, president, said following a meeting in Corpus Christi last week.

Previously, Porter said, the association had asked a hearing on the general steel shortage. However, he said, the members of the association now think that the lack of tubular goods needs special attention.

Porter said that part of the high rate of oil imports, which according to the Texas Railroad Commission, now is about 200 percent above prewar imports, could be attributed to the inability of independent operators to obtain steel.

A resolution was adopted commending the House Appropriations Committee for denying funds for continuation of the Oil and Gas Division of the Department of the Interior.

A committee to study the price of crude oil in the East Texas field and to make recommendations has been named by Porter and includes Bryan Payne of Tyler, and W. L. Pickens and Malcolm Wilson of Dallas.

French Plans Include Pipe Line

The French Commission for the Modernization of the Oil Industry will undertake the construction of a 10-inch, 160-mile pipe line between Le Harve and Paris, France. Construction will take 18 months and will cost about $672,000. The line is intended to transport gasoline and gas oil to Paris, while other petroleum products will continue to be shipped via the Seine.

The line will require some 22,000 tons of pipe, according to *Iron Age* which further stated that "action on it will probably be delayed for some time."

Meanwhile, the French government intends to continue to conduct geophysical and geological exploration in southern France. Footage totaling 780,000 feet is planned to be drilled in exploration tests over the next six years.

In North Africa, 30 rotary rigs are planned to drill 100,000 feet, and French Equatorial Africa will be tested by 6 heavy and 7 light rigs. The other French overseas possessions, including Madagascar, Cameruns, New Caledonia and Indo-China will all be explored for oil, but not until the programs in France and North Africa are completed.

New Refining Arrangement At Italian Plant Reported

Ecomond News Agency of Rome, Italy, has announced that Standard Oil Company (New Jersey) has concluded an agreement with Azienda Nazionale Indrogenazione Combustibili (ANIC) for the refining of Middle East crude oil at the Bari, Italy, refinery with the products to be sold in Europe.

The agreement, which the news agency says was confirmed by both the chairman of ANIC and representatives of Jersey Standard in Italy, was reported based on Standard completing its pending deals in the Middle East. The agreement, the agency says, provides for the extension of the Bari refining facilities to enable the plant to handle 720,000 tons (about 5½ million barrels) of crude oil annually as compared with its current 500,000 tons (about 3,800,000 barrels).

The Bari refining area assumed noteworthy importance following the discovery of oil and methane in the Varano and Lesina Lakes areas on the Gargano peninsula.

Other reports say that British oil groups are negotiating with the Italian government for oil concessions in the Forli and Tramutola districts of Italy.

February Output Promises High Mark for Venezuela

Venezuela production continued high through the first months of 1947, with indications that there is to be no decrease in the demand which is certain to carry it to a new peak this year. February output amounted to 32,719,427 barrels, an average of 1,168,551 barrels daily, which compares with January's daily average of 1,152,997 barrels.

Total cumulative for Venezuela has reached 3,665,432,980 barrels, nearly three billion of which has come from western fields.

Creole Petroleum Corporation, leading producer of the country, was responsible for a daily average of 599,192 barrels during February with the Shell group producing 315,658 barrels daily and Mene Grande Oil Company, 196,764 barrels daily. In recent months, Socony-Vacuum has supplanted the Compania Consolidada (Sinclair interests) in fourth place with a daily average of 26,004 barrels for February, all from Eastern Venezuela.

Australian Activities

Exploratory oil concessions have been granted to Australian Mining and Smelting Company, Ltd., covering 9000 square miles near the Western Australia and Northern Territory border, and to Roma Blocks Oil Company, covering 10,000 square miles in Queensland, Australia.

The Commonwealth government, which recently released through the Minister of Supply and Shipping a document outlining its intention to assist in oil exploration, expects to commence a geophysical survey of certain areas immediately.

Haiti Test Abandoned

The Atlantic Refining Company's Cul-De-Sac 1, wildcat test northeast of Port-au-Prince, in the central plain of Haiti, failed to give indications of oil in a series of drill-stem tests and has been abandoned at 7950 feet in Oligocene limestone formation.

This is Atlantic's third failure in the central plain area of Haiti. The company's Maissade 1 was abandoned in Oligocene limestone in 1945 at 9010 feet. Jurinet 1 was deepened and abandoned in Eocene formation in 1946 at total depth of 8804 feet.

Czechoslovakia Output

Crude oil production in Czechoslovakia during 1946 is reported at 23,000 metric tons (155,710 barrels). The refinery at Dubova in Central Slovakia has been repaired to within 20 percent of its normal capacity. However, at Bratislava, one of the largest refineries in Czechoslovakia, formerly owned by Apollo Mineral Oil Company, is capable of operating at only 50 percent of its prewar capacity.

Philippine Plan

Standard Vacuum Oil Company has applied for a franchise to develop oil resources of the Philippines and, according to a press report from Manila, President Roxas has recommended congressional approval of the application.

Government Relations in Venezuela Said Agreeable

Relations between the oil industry and the Venezuelan government are excellent, and give promise of remaining so for some time, Arthur T. Proudfit, president, Creole Petroleum Corporation, declared last week in New York.

A contract has been signed by Creole with the Venezuelan government agreeing on details in connection with the construction of the large refinery at Amuay on Paraguana Peninsula, he reported.

Proudfit said he believed the Venezuelan government is making every effort to encourage the industry through special customs and tariff benefits in cases where material is being imported to further the nation's interests. He believes the tax situation to be stable now and that the government will live up to its present statements of policy.

Proudfit said the announcement of oil industry participation in the financing of the Venezuela Basic Economy Corporation, an organization which will undertake to increase food production in Venezuela, was of particular interest and utmost importance in its far-reaching possibilities.

The food situation has been a major cause of concern on the part of the petroleum industry in Venezuela. The country's industrial expansion, with attendant dislocation of population has far outstripped the ability of farmers to meet the nation's food requirements.

Some oil companies, including Creole, took steps in the direction of the program outlined by the Basic Economy Corporation as early as eight years ago, undertaking basic agricultural studies and establishing experimental and demonstration farms, hoping for some ultimate agricultural benefits, but these plans were not on a large or varied enough scale for any real results.

East Hungary Show

A wildcat test, which has reached a depth of 3600 feet, has confirmed the presence of oil near Hagybajom, in Bihar, eastern Hungary, according to London reports. A further report said that large quantities of natural gas have been found in the nearby area of Boszormeny.

Deep Test Indicated for New Azerbaijan Oil Field

A new oil field has been discovered in the Kazan-Boelach area of Azerbaijan, USSR, according to reports by "Izvestia." A new petroleum trust has been set up in Kirovobad for its exploitation, and a number of deep tests will be drilled immediately.

Trans-Jordan Rights

Petroleum Development Company, London, an associate company of Iraq Petroleum Company, has been granted exclusive rights for the exploration and exploitation of petroleum in Trans-Jordan for the next 75 years, reports from Jerusalem say. Details of the contract are lacking.

API Production Division Meet

Pacific Coast District told of new developments in field work; Watts is chosen as next chairman

By GILBERT M. WILSON
Staff Writer

Two papers of major importance highlighted the technical sessions of the spring meeting of the American Petroleum Institute, Division of Production, Pacific Coast District, at Los Angeles last week. John M. Lovejoy, president of the Seaboard Oil Company, addressed the group on "Public Good Will and the Oil Producer," and Jules E. Toussaint, head of production for Standard Oil Company of California, spoke on "Organization Elements: Their Relation to Oil and Gas Producing Operations." Other papers dealt with new developments in the interpretation of electric logs, discussions on the selection of various types of mud, problems of well completion in unconsolidated sands, proposed changes in casing standards and designs, and other topics.

Highlights of the Thursday evening banquet was an address by Manchester Boddy, publisher of the *Los Angeles Daily News*. Boddy, only recently returned from a tour of Europe, spoke on "America's Position in Europe." He emphasized the terrible living conditions of Europeans and declared that it was shockingly true that many of our most capable leaders in the field of industry, science, religion and education have utterly failed to comprehend the meeting of the tremendous five-fold growth in population in Europe during the last three centuries.

Boddy saw demoralization of the whole world as a result of the fact that the masses of Europe have taken possession not only of the political process of Europe, but of its intellectual, moral, economic and religious life as well. The mass man has custody of a ripe and marvelous culture which he hasn't the wit to understand.

Refers to Russia

Russia, Boddy stated, is largely agrarian; her industries are not well rooted and are not yet even in the early stages of adequate production. This means that working Russians must labor in the fields, in the mines and in the forests to produce raw material to feed an ever-expanding industry. But very little of industry's production comes back to them because it is being diverted into a vast military establishment. In these circumstances, Boddy sees the classical conditions that make for revolution. It makes no difference whether the workers' production goes into a battleship or a Czar's palace—if it doesn't come back to the worker, he becomes dissatisfied. In Russia this is taking place on a large scale; therefore Russia is headed for serious trouble.

Boddy believes that during the next 10 to 15 years, the United States will turn her back more and more to fading Europe, which now is a sick appendage of Asia, and will turn her face to the dawn that is breaking in Asia. It means that the center of American economic activity will gravitate more and more to the West. China probably will be the first nation to become established. That will be the new foundation for our export trade and from China, other sections of the Orient will gradually develop a mature economy. The opportunity of the United States lies in the Pacific area.

Among those present at the meeting were J. L. Hamon, API vice president for production, and J. L. Stillwell, API chief engineer of division of production.

Abstracts of the papers presented follow:

Recent Developments in Casing Standards and Design

By JOHN WAIS, JR., Pittsburgh Steel Company, Los Angeles.

Important changes in casing standards and design have been proposed during the past five years, but which were held in abeyance during the war emergency. Discussions at the 1946 fall meeting of API indicated an increased field demand for the revisions, and preliminary developments on several subjects are discussed. A proposal to increase casing thread standoff one turn was acted on favorably, subject to letter ballot. This change permits one more turn of makeup during the assembly of the couplings by the manufacturer as well as in running pipe in the field. Greater care will be required to develop this additional makeup without damaging the pipe or couplings either due to thread friction or crushing with tongs. Flattening combined with notching may cause serious reduction in bursting strength.

Coupling stresses due to makeup and internal pressure are additive according to analytical investigations, and the added makeup combined with high pressures result in values which should not be disregarded in designing for increased

Pipe Line News

Tennessee Gas Companies Seek Facilities Permits

The Federal Power Commission will open hearings in Chattanooga, Tenn., May 26 on applications of Southern Natural Gas Company and East Tennessee Natural Gas Company for facilities which will increase the former's capacity from 255,000 to 384,000 Mcf daily and give the later, a recently-organized company, a capacity of 62,325 Mcf daily for delivery at Chattanooga, Knoxville and surrounding areas.

Southern's application provides for construction this year of an additional 8000 horsepower compressor facilities, 18½ miles of 20 and 22-inch loop paralleling its main line and 15½ miles of 6⅝-inch loop along branch lines, and for completion next year of five new main-line compressor stations and two branch-line compressor stations, 14 miles of 20-inch main loop line and 33 miles of 12¾-inch branch loop.

East Tennessee plans to build 186½ miles of 16-inch line from the Tennessee Gas and Transmission line to the vicinity of Chattanooga, and 112 miles of 12¾-inch line from that point to Knoxville, with laterals to adjacent communities.

Gasoline Plant Operation Forestalled by Hookup

Transportation and market outlet for Phillips Petroleum Company's natural gasoline plant production in West Texas and Lea County, N. M., has been assured for the duration of the strike at its Borger, Texas, refinery, through consignment of the products to Stanolind Pipe Line Company's crude carrier.

Metex Pipe Line Company, transportation unit of Phillips Petroleum Company, has taken lease on Humble Pipe Line Company's idle lines between Hobbs and Wasson fields, and will connect to them at point where its Hobbs-Borger 8-inch products line intercepts, then pump northeast to Stanolind's Wasson field station. This arrangement forestalls threat of suspension of gasoline plant operations in the Permian Basin for lack of market for the products.

North Texas Replacement

The Texas Pipe Line Company is providing larger facilities for handling mounting production in southern Archer County and northern Young County, Texas, by installing 11½ miles of replacement lines. Four miles of 4-inch in its system to the north of Olney is being replaced with 6-inch, while 7½ miles of 2- and 3-inch units southwest of Olney will be substituted with 4-inch pipe.

Temporary Installation

Stanolind Pipe Line Company has built a 12-mile 2½-inch crude line from the Landon 2-well field, Cochran County sector of West Texas, to connect with Magnolia Pipe Line Company's system that serves the Dean and Slaughter fields.

This line is a temporary arrangement until Stanolind carries out previously announced plans to build an 80-mile 8-inch extension from its Slaughter field station, Hockley County, thence west to the Cap Rock field, New Mexico.

Bids Asked on Loop

The 17 mile 10-inch crude oil loop planned by Interstate Oil Pipe Line Company in Mississippi is between Cranfield and Liberty stations, rather than between Liberty and Baton Rouge terminal as reported in THE OIL WEEKLY May 5. The company has issued specifications and asked for bids on this loop.

Ask for Compressor

New York State Natural Gas Corporation has filed an application with the Federal Power Commission for authority to build a compressor station and connections to the Big and Little Inch lines in Green County, Pa.

tensile and burst requirements. Higher internal test pressures are being requested by users and more definite values for maximum test requirements are required to permit proper design of testing equipment. Higher strength casing joints utilizing upsetting and various methods of treating to increase strength are being developed. Joint strength data for information purposes were approved for publication by the main Pipe Committee at the 1946 Fall API Meeting.

A General Pressure-Volume-Temperature Correlation for Mixtures of California Oils and Gases

By M. B. STANDING, Standard Oil Company of California, La Habra, Calif.

The solution of reservoir performance problems requires that the physical properties of the reservoir fluids be known. These properties may be determined in the laboratory either from bottom-hole samples or from proper recombination of surface trap samples. Where the results of laboratory tests are not available, however, the physical properties must be estimated from field measurements. The purpose of the paper is to give the results of several correlations between the physical properties normally measured in the field and the physical properties necessary for the solution of reservoir performance problems.

The paper presents correlations of bubble point pressures, formation volumes of bubble point liquids, and formation volumes of gas plus liquid phases as empirical functions of gas-oil ratio, gas gravity, oil gravity, pressures and temperature. Although the correlations are on California crude oils and gases, comparisons are made for the various crudes reported by Katz. The evaluation of bubble point pressure, bubble point formation volume, and two-phase formation volumes from the correlations, presented in the several figures in the paper, is somewhat laborious, so in order to facilitate correlations, calculating charts were constructed. From these charts it is possible to obtain quickly engineering estimates of the physical properties of multi-component hydrocarbon systems under pressure and temperature conditions encountered in oil and gas producing reservoirs.

True Resistivity Determination from the Electric Log—Its Application to Log Analysis

By H. G. DOLL, J. C. LEGRAND and E. F. STRATTON, Schlumberger Well Surveying Corporation, Houston.

A distinction is established between the observed resistivity or apparent resistivity, and the resistivity of the undisturbed formation or true resistivity. The general relation between the apparent and true resistivity is discussed. A method is described for determining the true resistivity of geological formations traversed by a bore hole through application of resistivity departure curves to the apparent resistivity measured on the electric log. If several well chosen electrode spacings are used, and provided the mud resistivity and the bore hole diameter have been determined opposite the formation, the true resistivity of invaded formations can be evaluated. It is emphasized that it is important that mud resistivity be determined accurately, with correction being made for temperature.

The resistivity departure curves constitute a valuable means for true resistivity determinations and their use will greatly assist in the interpretations of electric logs, particularly with respect to quantitative analysis of permeable formations. The effects of electrode spacing, hole diameter, mud resistivity and invasion of formation by mud filtrate are discussed with examples given of their influence on the apparent resistivity. A short section is given outlining the electrode devices used in electrical logging of the bore hole.

District Officers

District officers for 1947-48 term were named at the Los Angeles API Production Division meeting as follows: E. V. Watts, General Petroleum Corporation, chairman; L. R. Rogers, Superior Oil Company, chairman Los Angeles C Basin District; K. E. Gregsby, The Norwalk Company, chairman San Joaquin Valley District; R. L. Patton, The Texas Company, chairman Coastal District; W. G. Corey, Lacy Oil Tool Company, secretary-treasurer; Mrs. Elsie M. Edmiston, API assistant secretary; R. D. Montgomery, Richfield Oil Corporation, chairman advisory committee.

E. V. Watts

Development of Thread Sealing Lubricants

By H. C. ZWEIFEL and L. J. GRUNDER, Richfield Oil Corporation, Los Angeles.

In recent years it has been known that casing and tubing strings have in some instances developed leaking joints—a serious problem. One of the earliest causes of leaking joints was improperly mating threads and considerable attention was directed toward a closer inspection by the purchaser and the establishment of API cooperative testing and specification programs. The cooperation of the mills resulted in more satisfactory threading of tubular stocks, thereby reducing leaking joints to a minimum. However, with the advent of deeper drilling, more severe problems have been encountered such as higher pressures, havier string loads, and higher formation temperatures. Each undoubtedly exerts its influence toward increasing the number of leaking joints.

Following numerous tests on various types and sizes of pipe, together with different types of lubricant, the authors found that a major portion of the difficulties encountered with the leaking and galling of all types of threaded members can be eliminated by the use of the proper thread lubricant both at the mill and in the field. Development of a satisfactory thread sealing lubricant resulted in rejection of conventional materials and indicated superiority for a combination of malleable metals. Upon application, it must be capable of adhering to and metallizing thread surfaces without undue separation caused by heat, weathering, oil or water, and capable of protecting, lubricating and sealing mating members. The problem of makeup practices should be investigated, possibly on the basis of a cooperative program between manufacturers of oil country tubular goods and the consumers. Present specifications established by the API are satisfactory, with one exception. The pitch diameter of threaded members with reference to the corresponding "actual diameter" is of vital importance in respect to thread damage and "break-off." This one factor may be of incalculable value in reference to the establishment of more satisfactory makeup practices. Revised mill practice for hydraulic testing should accomplish both testing for bursting strength and testing for mill and thread leakage.

Public Good Will and the Oil Producer

By JOHN M. LOVEJOY, president, Seaboard Oil Company, New York.

Citing several examples of the very high dollars-and-cents value of a name and public good will, together with the amount of work and time necessary to build up a good reputation in the eyes of the public, the author laid emphasis on the potential value to the oil industry in the current public relations campaign currently being conducted by the API. Persons in the oil industry can themselves do a great deal of good by seeing to it that people with whom they come in contact are acquainted with problems of the industry. The individual first can talk about the work production experts are doing in trying to get the last drop of oil from underground reservoirs.

Second, the oil man can "talk up" the oil industry as being a most progressive part of American life. The characterization of the oil industry as progressive is its best defense against regulation.

The author reviewed a number of accomplishments of the industry and asserted that if the public knew these things regarding the technological advances made by the industry, they would be tremendously impressed and pleased. If they realized that, but for such advances, they would now be woefully short of petroleum products, they would indeed say "well done." If they knew similar facts about the other branches of the industry, they would all be our fast friends for life.

Control of Unconsolidated Sands in Wilmington Oil Field Wells

By READ WINTERBURN, Union Pacific Railroad Company, Los Angeles.

As a result of a detailed study of performance records of 260 wells in the Wilmington field, it was found that almost completely effective control of the unconsolidated sand of the Tar, Ranger and Upper Terminal zones has been accomplished in wells which are equipped with pre-packed liners using gravel ranging in diameter from .093 to .131 inches, or gravel packed liners using gravel of .131 to .187 inches in diameter or smaller. Use of larger gravel as well as slots of .030 inches in width, round holes of 3/32-inch diameter, and 15 or 20 mesh wire wrapped liners will not prevent sand trouble.

Plugging of gravel packs and pre-packs causes a more rapid decline in productive index than that which occurs when conventional liners are used. However, greater economic returns are possible during the early history of a gravel packed or pre-packed well designed to screen all sand due to the well's ability to produce at higher rates without sand trouble and because of the lower production costs. Cost of remedial measures necessary for restoration of productivity in plugged gravel packed and pre-packed wells will be no greater than the redrilling cost to be expected with conventional liners. Control of sand production through control of flow into the well has

not been successful, since a successful application would involve such low rates of production as to make it impractical under competitive conditions.

The Determination of Stresses in Oil Well Casing in Place

By C. H. OBERG, Standard Oil Company of California, Taft, and R. W. MASTERS, same company, Kettleman Hills.

The paper describes the equipment and method used to determine the magnitude of changes in stress in oil well casing after it was in place in a well and while it was affected by varying temperatures during drilling and producing operations. Data from tests indicate that casing landing tension varies greatly as the casing is affected by temperature and pressure conditions in the well. The freeze point of the casing sometimes rises very rapidly from the top of the cement to the shoe of the next size casing and it was found that apparent freeze points above the top of the cement may cause erroneous landing weights. All of the casing above the top of the cement tends to act as free casing because of the movement of the casing through the caved-in freeze points. Temperature and pressure changes tend to cause the casing above the top of the cement to move up or down through any freeze points that are quickly formed by caving formations. Properly landed casing will not develop dynamic stresses of dangerous magnitude during drilling operations carried on inside of it, but stress variations during producing operations are likely to be more severe than those encountered during drilling operations. The pumping of cold fluids into the casing in wells with high landing tensions should be avoided.

The Evaluation of Completion Practice from Productivity Index and Permeability Data

By F. R. WADE, Union Oil Company of California.

The paper reports on the analysis of permeability, productivity index and well completion data for a large number of California wells under the auspices of the Pacific Coast District Production Technology Committee of the API Division of Production. A factor, designated the "production effectiveness" is derived from the productivity index and permeability data for each well, and it is used as a basis for comparing the efficacy of various completion practices. Various studies are made to establish the magnitude and range of variation of the production effectiveness. It is shown that the production effectiveness is the ratio of the calculated absolute reservoir permeability to the average air permeability determined by core analysis. It therefore has a theoretical maximum value of unity and should remain constant throughout the life of the well. Empirical data indicate that the production effectiveness is reasonably constant through a large part of the producing history of a well, and that it has approximately the same magnitude for a wide variety of reservoir and well conditions. Well completion data are analyzed with respect to the production effectiveness with the following results:

1) For individual pool and gross data it is shown that the length of time necessary to drill into the zone and complete a well will appreciably affect the productive effectiveness.

2) Gross correlations indicate a slight advantage of slotted liner completions over gun perforated completions in production effectiveness.

3) Gross correlations indicate no advantage for special and oil base muds over water base mud in production effectiveness, but it is demonstrated that this conclusion is apparently the result of unequal weighting data.

4) Individual pool correlations show an advantage of oil base mud over water base in the two cases for which sufficient data for testing this relationship were available.

Factors Influencing the Selection of Mud Fluid for Completion of Wells

By H. E. RADFORD, Shell Oil Company, Inc., Ventura, Calif.

In addition to a review of previous reports, new evidence is presented to show that damage to the productive formation does occur due to action of clay-water mud on sands as drilling proceeds. Field evidence shows that use of special muds tend to reduce the amount of damage done. The principal objective in selecting a drilling mud for completion work in a given well is to obtain the maximum productivity for that well, and each of the several special muds available have certain exclusive advantages which may result in their selection for a particular job. The paper points out characteristic advantages of these muds and gives examples of their use under appropriate circumstances.

Substantial field evidence exists to show the harmful effects resulting from contact of normal clay-water muds with an oil sand. It would therefore be logical from a technical standpoint to use either oil-base mud or crude oil as a completion fluid in every well to avoid any infiltration of water into the sand. From a practical standpoint, however, cases are found where either normal clay-water mud, or one of the special water base muds such as drilling emulsions, starch mud, or carboxymethylcellulose mud can be used logically and on a sound economic basis. The selection of the particular water mud to use requires analysis of well conditions to be met, and adaptation of the mud best suited to those conditions. Under circumstances where sands have low permeability and at the same time are strongly affected by water, or where a particularly thin mud sheath is required, use of oil-base mud is definitely indicated and the payout is apparent.

Organization Elements: Their Relation to Oil and Gas Producing Operations

By J. E. TOUSSAINT, General Manager, Producing Department, Standard Oil Company of California, San Francisco.

It is postulated that conditions in the California oil industry are, or will be, such that sound organization will be an asset to assure successful operations. The author points out that a) exploration activities will quite likely involve increased risk as to success, and therefore costs of discoveries will be higher; b) many of the wells will be deep and therefore costly even when efficiently drilled; c) other methods for increasing recoverable reserves, such as pressure maintenance, unit plans, secondary recovery projects, etc., will definitely warrant consideration. All of these involve planning, investigation, technical advice, and many of the elements that are involved in sound organization for oil and gas producing operations.

Discussion of 15 elements that warrant definite consideration were covered, among these being geological, land and lease, construction and maintenance, drilling, production, petroleum engineering, purchase and stores, accounting, personnel, and various other divisions.

Four essential organization fundamentals or concepts were discussed including a) there is no one particular organization arrangement or set-up that is necessarily applicable in all cases; b) whatever organization arrangement is chosen, should be clearly outlined by suitable chart and "job tickets" for each key position, and these combined in a management guide; c) the Line and Staff type organization is most generally suitable to an oil and gas producing organization; and d) the concept of "optimum combination of major and minor factors" indicates that to obtain optimum results, minor factors may have to operate at less than maximum efficiency to permit the major factors to operate at maximum efficiency.

New Electrical Logging Techniques in California

By J. C. STICK, JR., J. S. BAKER and R. G. NORELIUS, all of Lane-Wells Company, Los Angeles.

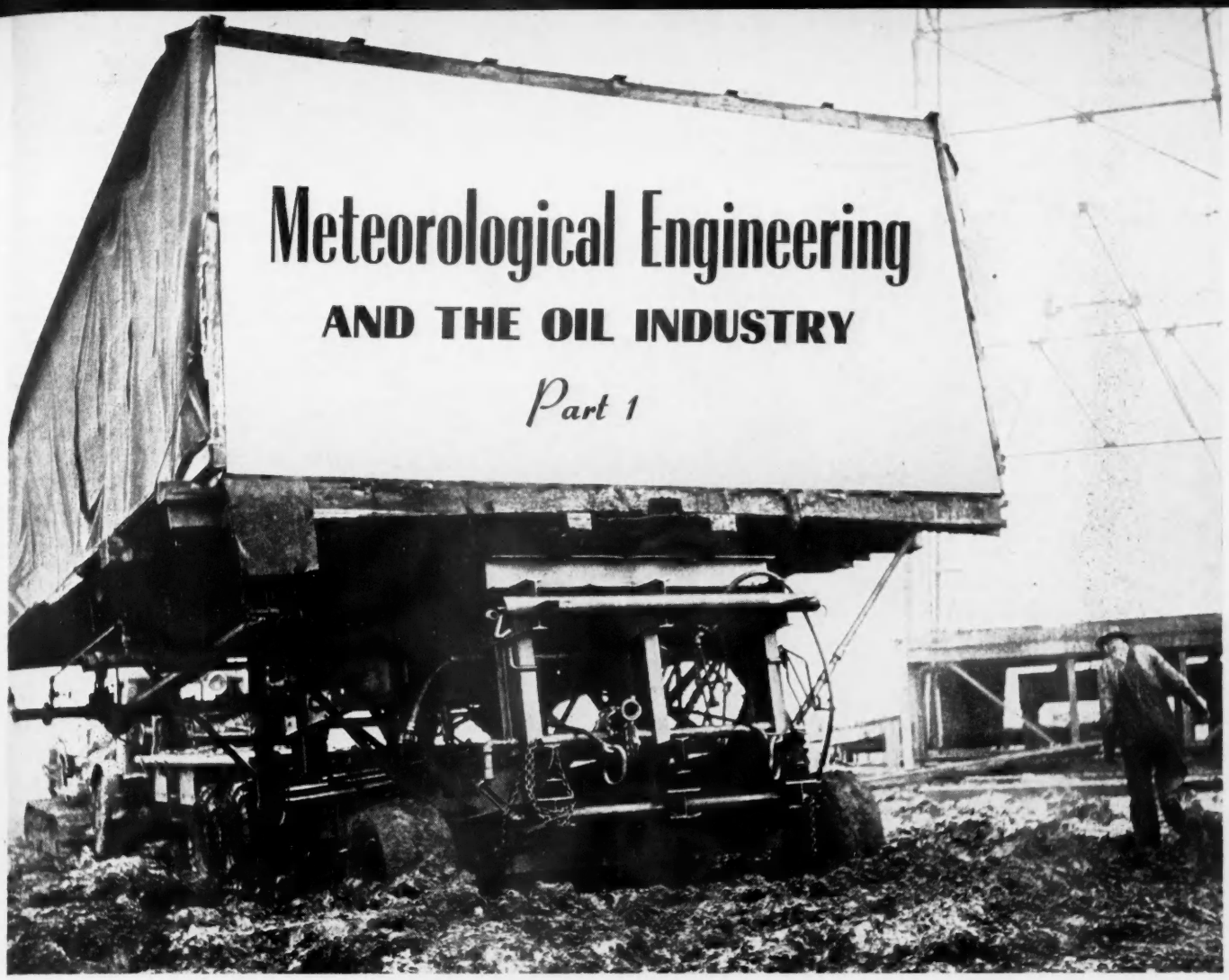
The widely varied nature of the geology and reservoir characteristics of California oil fields, coupled with the advanced drilling practices developed to offset them, have always imposed a severe challenge toward extending the usefulness of electrical logs. During the past year increased efforts to overcome certain of these limitations have been rewarded with a satisfying degree of success. Included in these problems are 1) fresh water-oil sand differentiation; 2) improvement in the accuracy and usefulness of logs made in oil base drilling fluids; and 3) the adaptation of resistivity curves to highly interbedded strata.

Problem 1 is overcome by a) penetrating the critical zones with a drilling fluid of lower resistivity than that of water already in the formation; b) recording a series of lateral investigation curves which have a sufficiently shallow depth of penetration to record resistivity of the formation which may have been invaded by the drilling mud filtrate; and c) the sands with resistivity sufficiently high to indicate the possible presence of oil should be inspected to see if the resistivity recorded by the very shallow curves has or has not been reduced by the loss of low resistivity mud filtrate to the formation. If there is a wide and uniform separation, it is highly probable that the sand contains primarily water. If the curves tend to group toward higher resistivity values, it likely is oil sand. Data from the critical sands may be plotted and compared by the slopes of the initial portion of the curves.

Problem 2 has been partly solved by a) reducing both the magnitude and intermittent nature of the electrical contact; b) designing of measuring circuits capable of establishing essentially constant formation current over a wider range of resistance variations; and c) incorporating a means for smoothing out the remaining effects of contact variation on the measuring circuit.

Problem 3 has been aided by recording a closely-spaced, double pick-up type of curve, termed a "shallow lateral resistivity curve," which has an effective depth of penetration of 17 inches. The response of the new curve to thin beds approaches that of the detail resistance curve with considerably reduced susceptibility to shale variations and bore hole diameter changes. The curve calibration is in resistivity units facilitating direct comparison with other resistivity curves.

Meteorological Engineering
AND THE OIL INDUSTRY
Part 1



Long-range field operational planning based on knowledge of future weather conditions could have made this moving job less difficult. Where weather plays an important role in oil field operations, meteorological engineering will provide the information which will minimize weather hazards resulting in a more efficient and economical operation.

By C. C. BATES and A. H. GLENN

METEOROLOGICAL engineering in the oil industry can be an important addition to long and short-range planning for exploration programs, marine construction and drilling, aerial supply and exploration, and detailed projects connected with the location and utilization of installations.

This branch of engineering, based primarily on the sciences of meteorology, oceanography, hydrology, and soil mechanics, evaluates the influence of weather upon man's activities. Having profited from wartime experience, meteorological engineering is now equipped to make important contributions towards elimination of the weather risk in industry.

In the past, the oil industry generally has neglected the weather factor in planning operations because of the difficulty in obtaining quantitative evaluation and prediction of the weather for any specific operation. Wartime advances have eliminated these difficulties and meteorological engineering now can be a valuable aid in industrial enterprise. For long-range industrial planning, it can supply accurate estimates of the range and frequency of environmental conditions to be encountered. For short-range planning, it can provide reliable weather forecasts to those responsible for the efficiency and safety of field operations.

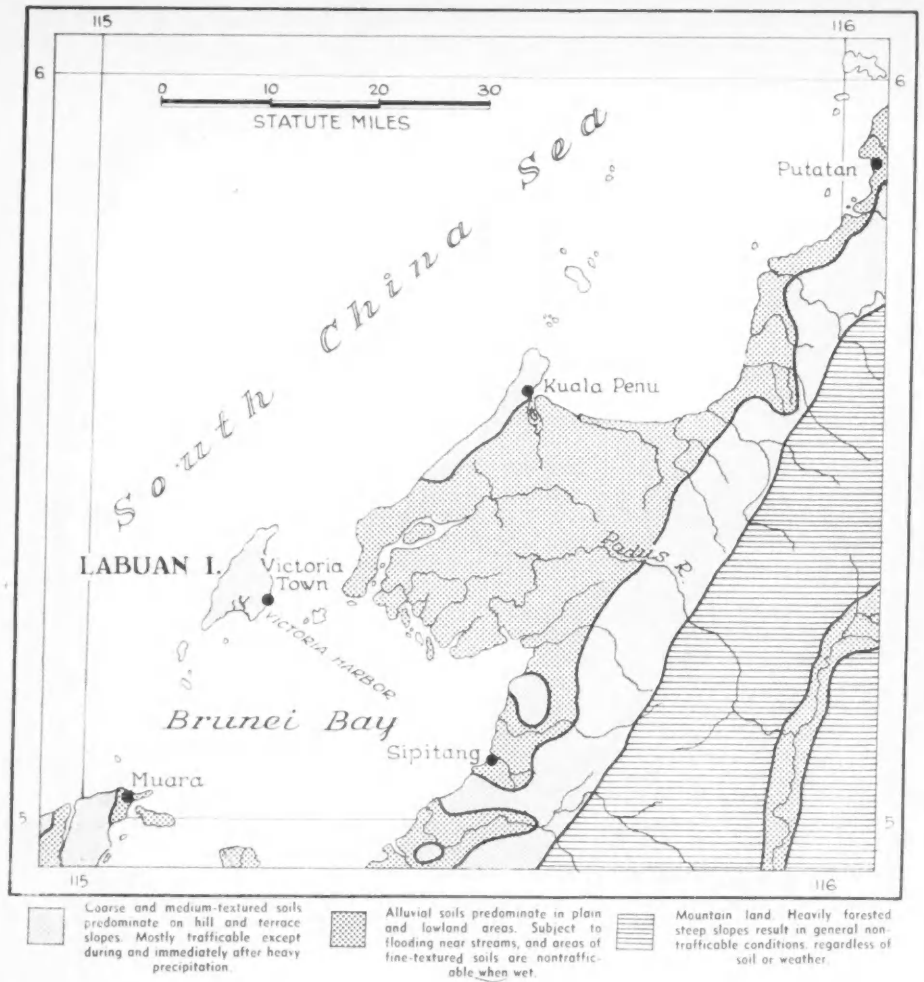
Exploration

The efficiency and rapidity with which geological and geophysical exploration are accomplished depends to a very large extent upon the mobility of vehicles. When inclement weather immobilizes cars and trucks or permits movement only with intensive effort, the exploratory program suffers. If the period of immobility is likely to last more than two days

About the Authors

C. C. BATES formerly was employed in the geophysical department of The Carter Oil Company. During the war he held a captain's commission in the Army air forces, specializing in oceanographic forecasting for amphibious operations. He was awarded the Bronze Star for furnishing sea, swell and surf forecasts for the invasion of Normandy. Later he was assigned as oceanographer on Operation Crossroads. He is now associate oceanographer with the Division of Oceanography, Hydrographic Office, Navy Department.

A. H. Glenn, who was employed before the war by Holway and Neuffer, consulting civil engineers, held a captain's commission in the Army air forces during the conflict, specializing in meteorological and oceanographic forecasting. He was an alternate USAAF member of the Subcommittee on Oceanography of the Joint Meteorological Committee and Governmental Advisory Committee on Oceanography. He is now a meteorologist with the Air Weather Service, USAAF.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116
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STATUTE MILES
South China Sea
Putatan
Kuala Penu
LABUAN I.
Victoria Town
VICTORIA HARBOR
Padas R.
Brunei Bay
Sipitang
Muara
Coarse and medium-textured soils predominate on hill and terrace slopes. Mostly trafficable except during and immediately after heavy precipitation.
Alluvial soils predominate in plain and lowland areas. Subject to flooding near streams, and areas of fine-textured soils are nontrafficable when wet.
Mountain land. Heavily forested steep slopes result in general nontrafficable conditions, regardless of soil or weather.

Figure 1 (top). Soil trafficability map for the vicinity of Brunei Bay, British Northwest Borneo.

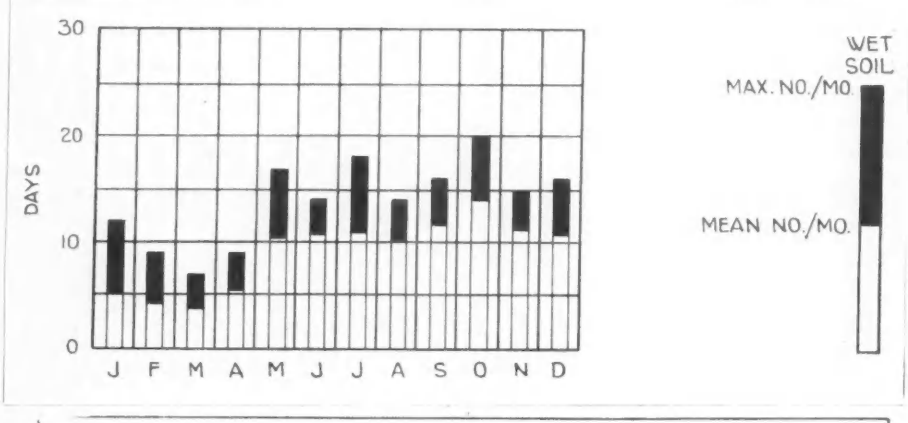


Figure 2 (center). Estimated number of days with wet soil in the vicinity of Brunei Bay, British Northwest Borneo.

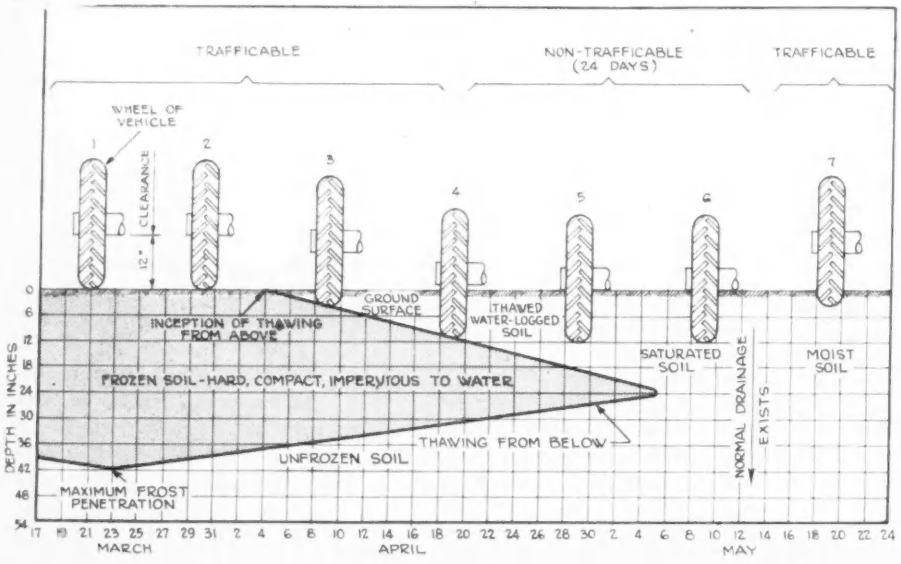


Figure 3. Trafficability of an earth road or a soil in relation to moisture conditions during the spring breakup.

at a time, attempts should be made to move the vehicles to areas suitable for rapid travel. If the weather does not improve, renewed mobility can be achieved only by transferring vehicles to an area with a network of better roads or to an area of better "soil trafficability."

Soil trafficability is the ability of a soil to support motor traffic. Equipped with special trafficability maps and climatic information, planners and field supervisors can avoid scheduling exploration in a locality with an excellent road network during "Indian summer" weather and leaving the nearby areas with poor roads and poor trafficability to be worked during the rainy weather probable a very few weeks later. For example, if plans are being laid for the survey of a large concession near Brunei Bay in northwestern Borneo, the information presented in Figures 1 and 2 indicate that field work should be carried on in areas mantled by alluvial soils during the drier months, January to April, when there are likely to be only five days with wet soil per month, leaving the better-drained and more permeable soil inland to be worked during the remaining months when as many as 20 days with wet soil may be expected monthly. If the hilly portion shown along the eastern side of the soil map is to be explored, work should be scheduled, if possible, between December and February when upslope winds, likely to accentuate the customary heavy rainfall, are infrequent.

When interpreting any of the numerous soil trafficability maps now available, it should be remembered that the important factors affecting soil trafficability are (1) topography, (2) surface obstacles, (3) character of soil, subsoil and bedrock, (4) weather factors, and (5) type and volume of traffic. Topography and surface obstacles may modify or even overshadow soil and weather features. For example, hilly or mountainous topography may preclude cross-country movement by any and all ve-

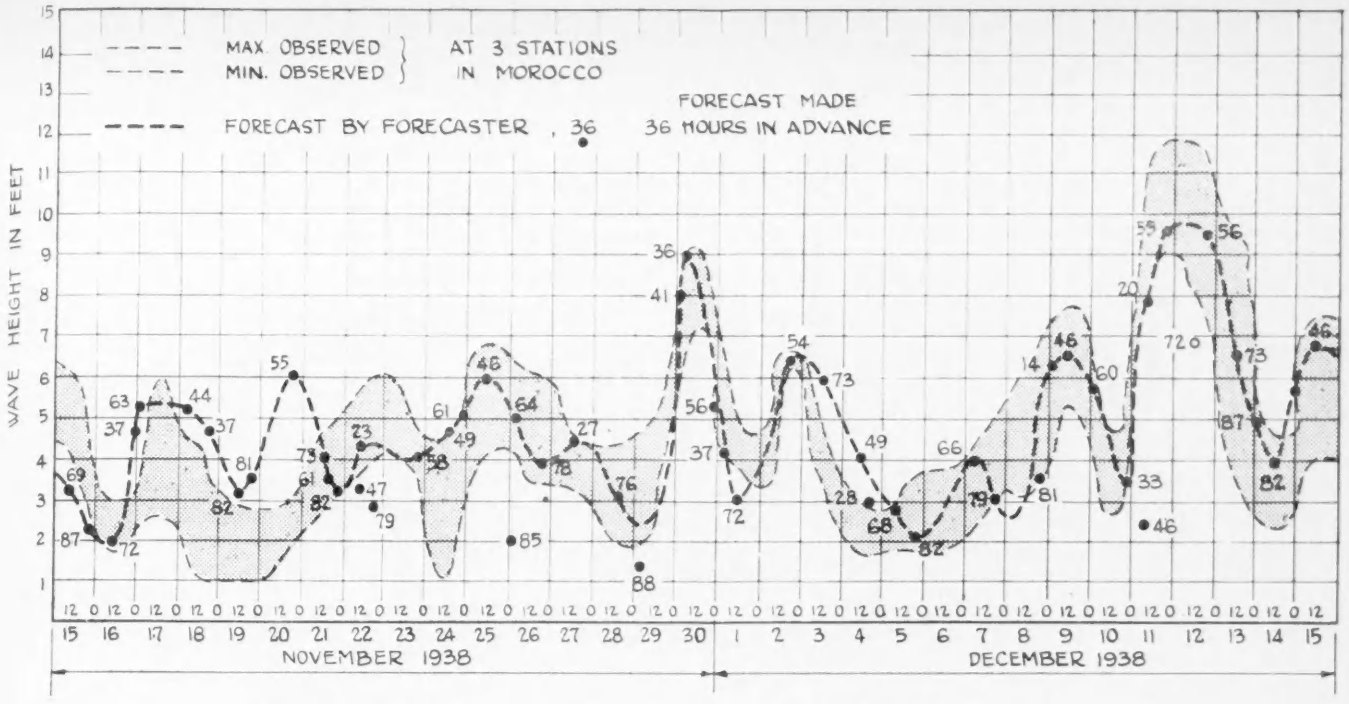


Figure 4. Observed and forecast wave (swell) heights along the coast of Morocco.

hicles and require roads. Soils trafficable on moderate slopes may be non-trafficable on steep slopes, and obstacles such as jungle, boulders, stumps, or thick brush may prevent travel in areas with otherwise favorable soil characteristics. Generally speaking, the load-bearing and traction characteristics of a soil vary inversely with the moisture content of the soil. Soils vary in themselves because of differences in parent material, topography, vegetation, and the climatic regime in which they form, but moisture content is primarily the result of precipitation, temperature, evaporation, drainage, and plant transpiration. In estimating the effect of precipitation, it is well to remember that rainfall is particularly effective in lowering trafficability when there is little water loss by evaporation or transpiration, as in the winter months. Rapid rainfall results in rapid runoff, and, with the exception of floods, has less effect upon mobility than an equal amount of rain occurring over a greater length of time. Therefore, climatic data should always be examined to determine the frequency of long rainy spells, for long rainy spells mean trouble.

Areas notorious for their low trafficability, such as swamps, muskeg, and poorly drained fields under cultivation, become readily passable during a severe freeze. Providing the snow cover remains light, such areas remain trafficable until a marked thaw occurs. Information relating to the probable duration of the frozen soil becomes a planning "must" when scheduling work for areas of this type. Such information is available from a number of sources, one of the most interesting being that of records kept by grave-diggers.

Once thawing sets in, it occurs from both above and below and may be either temporary or permanent, depending upon the fluctuations of air temperature. If steady thawing occurs, frost penetration of six inches usually causes poor trafficability for two to four days, while a frost penetration of 36 inches usually means nontrafficable conditions lasting from 14 to 18 days. If crews are to be moved into an area immediatedly after the spring breakup, the engineering meteorologist can, after learning the depth of frost penetration and the most likely rates of thaw, forecast the date of return of satisfactory mobility. A typical spring breakup situation which might be forecast is pictures in Figure 3. Here, with a maximum frost penetration of 42 inches, thawing proceeded from below at the rate of approximately 0.4 inch a day and began 12 days before thawing from above. Thawing from above, beginning April 4, proceeded at a rate of approximately .75 inch a day and it is apparent that the frost left the ground on about May 5. If wheeled vehicles with an axle clearance of 12 inches were to be used in the locality, there would have been excellent trafficability on frozen ground from March 17 to April 5, slippery conditions from April 5 to 14, practically impossible conditions from April 14 to 20, and complete immobility on all fields and earth roads from April 20 to May 12 because of the extremely high moisture content. Finally, some time between May 12 and 18, soil drainage and surface evaporation would have reduced the moisture content sufficiently to allow the soil to support vehicles and unrestricted field work could proceed except for brief rainy periods.

Another forecasting service of importance to the field supervisor can be provided when several exploration crews are near an area of normally poor trafficability which is to be worked in the near future. In this case, the meteorological engineer can, by waiting for the occurrence of special weather types, indicate when good trafficability will persist for appreciable periods. Under such conditions, all available crews can be concentrated in this critical area, and exploration be completed more rapidly and with less damage to equipment than if only one crew were employed on the project and required to work through several periods of poor trafficability. Other applications of this principle, which might be paraphrased as "Getting there when the weather is the 'bestest' with the 'mostest'", are in pipe line reconditioning, and the delivery and removal of equipment from pipe line right-of-ways and well locations.

Marine Construction and Drilling

A thorough knowledge of wave conditions that will be encountered during marine construction and drilling is a necessity if the structures are to be designed with proper safety factors. Wave and surf conditions became such important factors in determining the efficiency of the assault and supply phases of amphibious operations in World War II that the Army and Navy jointly investigated the problem. The forecasting techniques, only recently made public,

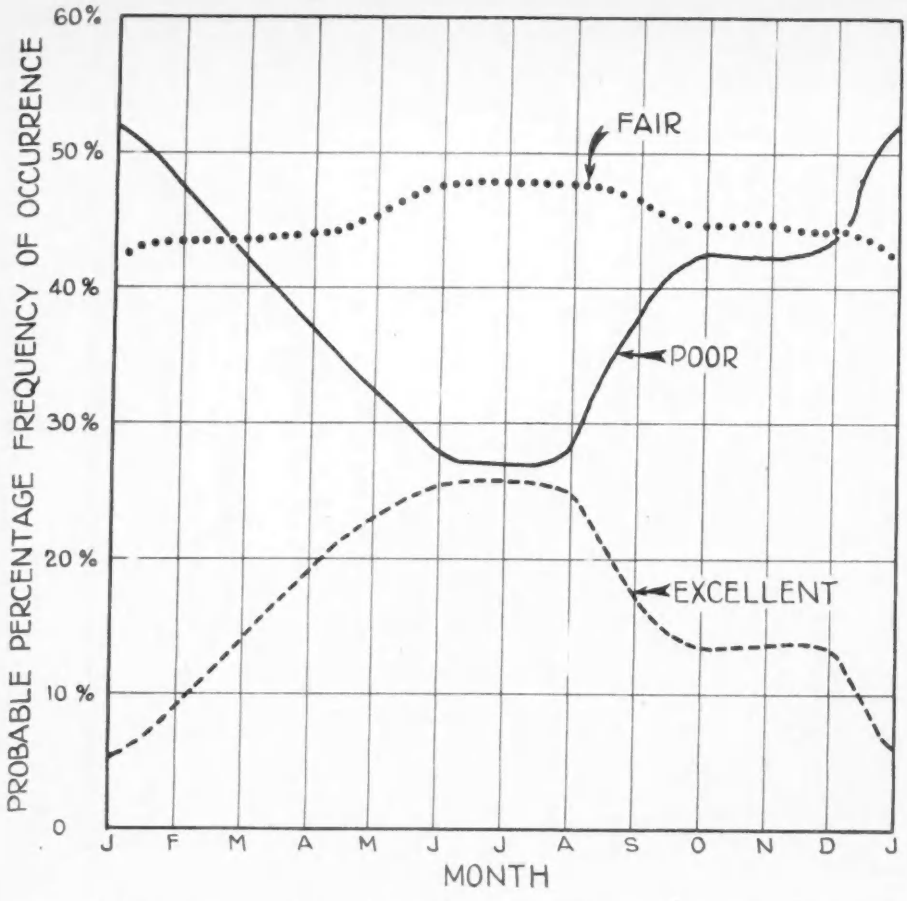


Figure 5. Probable occurrence of poor, fair, and excellent working conditions on the Continental Shelf between Cape Hatteras and northern Florida.

make possible quantitative forecasts of wave and surf conditions from standard weather data. Wave forecasts have been supplied with a maximum error of one foot for waves up to six feet in height, with less than a two-foot error for waves six to ten feet in height, and with slightly greater error for higher waves. Moreover, the length, frequency, steepness, and degree of variability also can be established. Even the striking transformation of swell into surf may be defined quantitatively.

Figure 4 illustrates the accuracy of swell forecasts for the coast of Morocco. The waves described in the figure were generated not far from Greenland and Iceland. During the single winter month shown, swell greater than six feet in height occurred on 12 days out of 30, although local winds were light. Swell only six feet in height off this coast form breakers nine to ten feet high which break in 12 to 14 feet of water. If structures such as drilling platforms were located off this coast, the swell forecasts would have provided adequate 24-to 36-hour notice of impending conditions, permitted postponement or speeding up of transfer of supplies, and given warning of possible damage to the structures. The cessation of dangerous conditions can be forecast with equal accuracy.

Forecasts of local wind waves are important in scheduling the operation of small craft and seaplanes for taxi and exploration purposes. If such forecasts are available, there is little need for recalling craft as soon as a storm warning is flown on shore eight to 24 hours before the onset of the storm. Instead, they may be kept on location until just a few hours before dangerous wave conditions develop. Similar forecasts may be used in planning immediate resumption of work after a bad "blow."

Climatic data indicating the probable occurrence of specified wave conditions are of considerable help in long-range planning. If the information is desired for a specific coastal locality, wave and surf conditions may be compiled from "hindcasts" made from several years of past weather maps. However, if a broad picture is desired of working conditions in a large area some distance offshore, their occurrence frequency may be computed from the thousands of sea, swell, and wind observations made by shipboard observers, providing, of course, that the effects of visibility, temperature, and type of weather can be neglected. The results of a study of this general type for the belt 15 to 25 miles off the Carolina-Georgia coast are graphed in Figure 5. Definitions of the conditions are shown in Table I.

Best Working Months

It is evident that suitable conditions for all types of work are most frequent during June, July and August and least frequent in January. The improvement during the summer months is largely the result of a sharp increase in the frequency of occurrence of excellent conditions. The frequency of fair conditions remains remarkably constant throughout the year even though excellent conditions are likely to be about five times more frequent in June than in January. The marked deterioration in the frequency of excellent conditions between December and January is also noteworthy, as is the fact that poor conditions are quite frequent during even the summer months. With such information at hand and a knowledge of the wave conditions likely to jeopardize the undertaking, work schedules can be based upon quantitative information and not on mere hunches.

Frequency data similar to those shown above for offshore areas may be computed for various surf heights expected monthly along a coastline several hundred miles long. This type of information is particularly helpful in the preliminary planning for construction in the surf zone and for discharging and loading supplies across open beaches at isolated camps, towns and well locations. It allows the planner to anticipate the conditions for various times of the year, coastal exposures, and parts of the world.

[To be concluded next week.]

TABLE 1
Definitions of Conditions at Sea

Description of Conditions	Sea Surface Conditions	Working Conditions
Excellent	Wind waves 0—3 feet in height and/or swell less than 2 feet in height.	**Ideal** for marine geophysical surveys, construction in exposed waters, and sea passage by all types of small craft, including barges.
Fair	Wind waves 3—5 feet in height and/or swell 2—6 feet in height.	**Some difficulty** experienced in marine geophysical surveys, construction in exposed waters, and operation of small craft.
Poor	Wind waves 6 feet or more in height and/or swell greater than 6 feet in height.	**Considerable difficulty and occasional impossible conditions** experienced in marine geophysical surveys, construction in exposed waters, and operation of small craft.

Muffled Derricks For Residential Areas

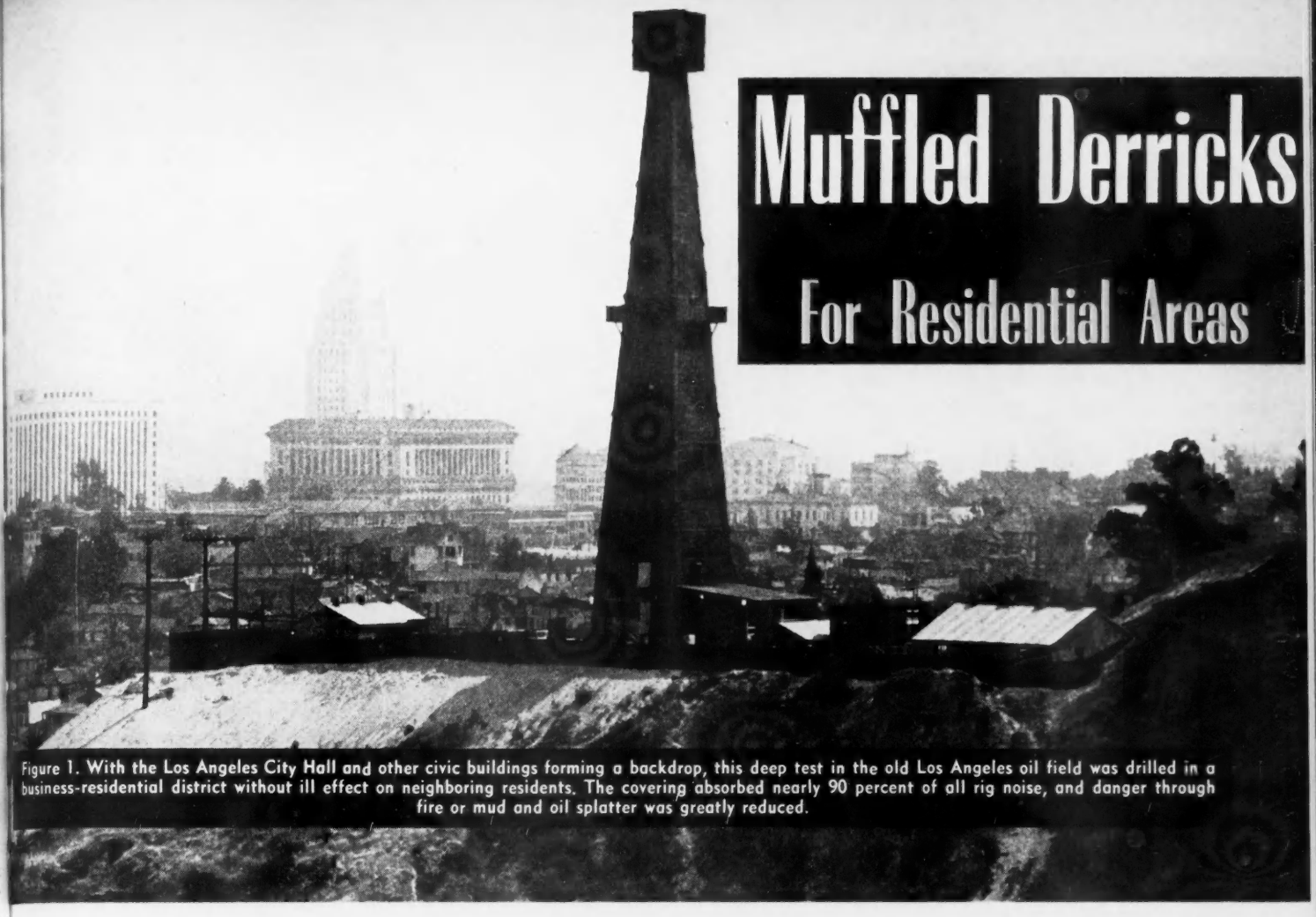


Figure 1. With the Los Angeles City Hall and other civic buildings forming a backdrop, this deep test in the old Los Angeles oil field was drilled in a business-residential district without ill effect on neighboring residents. The covering absorbed nearly 90 percent of all rig noise, and danger through fire or mud and oil splatter was greatly reduced.

—Photo Courtesy Vaculite Products Company.

By GILBERT M. WILSON
Staff Writer

WITHIN the past few years, oil well derrick coverings made of materials that are fire-resistant, water-proofed and sound-proofed, to name but a few of their characteristics, have made their appearance in certain California fields.

Local ordinances restricting drilling, proximity of the location to hospitals or public buildings, and areas where oil or mud spray cannot be tolerated, are the chief reasons making the derrick coverings imperative. The multi-layer fabric materials are cut into panels to fit corresponding girt sections of the rig, and in addition, panels are available for covering engine houses, cellar openings beneath the derrick floor, and other structures used at the drilling site. Specially designed, patented hooks and pins are employed for quickly installing and removing of panels. With reasonable care, the panels can be used many times, reducing initial cost to a very small per-well figure.

Wide Possibilities

Although these covers originally were designed primarily for use on derricks in inhabited areas or town-lot districts, they hold great promise of being adaptable to drilling conditions during the cold winter months in Rocky Mountain regions and in other areas where some protection against the elements is desired. Illustrating their winter possibilities is the fact that two drilling rigs, one a standard 136-foot derrick and the other a cantilever-type rig, operating in the Naval Petroleum Reserve near Point Barrow, Alaska, were equipped with the covers for protection against cold and snow.

Derrick covers are not new to the oil industry. Photographs of early wells in Pennsylvania and views of Roumanian and of Russian fields all reveal the extent to which coverings or housings have been used on oil derricks, although the wooden slats or sheeting used on such wells cannot be compared to the purposes of, and materials used, on present-day coverings.

Not only are the new coverings superior from the standpoint of being fire-resistant, water-proofed, and sound-proofed, but their use is highly desirable in certain areas also for reasons of safety and comfort to the men on the rig.

Multi-Layer Panels

Each panel is made up of several layers of various types of material. The outer layer is of 11.6-ounce canvas duck which is flame-proofed, mildew-proofed and water-proofed with a new-type plastic substance. Next is a layer of muslin, to which is sewed a two-inch thick layer of six-pound density rock wool, the latter being backed with a heavy kraft paper. The three materials, muslin, rock wool and paper, then are quilted to form a single layer. The next, or final layer is of heavy duck, treated as is the outer layer described above.

Panel dimensions are such that there is a one-foot overlap on all sides, which permits the securing of the material around derrick leg corners and girts with assurance that little or no air will be able to circulate between the overlapping panels. With the aid of grommets attached to all four sides of the panels, the units may be laced to the derrick leg with light line, while clips and hooks are used for securing tops and bottoms together.

Installation of the derrick cover is

Figure 2 (Left). In installing derrick covering from a winch truck spotted a short distance from the well, wire lines are run to the derrick floor, up inside the derrick to the crown, then over sheaves and down the outside to a light scaffold. Two men ordinarily work on the scaffold. An entire side of the rig is usually covered before proceeding to the next side.

Figure 3 (Right). Covering material is made up into panels, each being designed to fit, with some overlap, the standard derrick girt. Panels are numbered to facilitate their being re-installed in the proper girt section. They are rolled up as shown for transportation between rigs.

relatively simple. A light winch truck is spotted some distance from the derrick and wire lines are rigged which run over to the derrick floor to blocks, up through the derrick to the crown, then over sheaves and down the outside of the derrick to a scaffold, visible in Figure 2. Two men ordinarily work on the scaffold, and covers are installed from top to bottom on an entire side before scaffolding is hoisted again to the top and moved over to the next side. Covers are relatively light and are rolled up for easy storage or hauling between jobs, as shown in Figure 3. When a new cover is installed, panels are numbered so they may be taken down and reinstalled with a minimum of difficulty during subsequent fitting to derrick girts.

One company has used a cover on several different jobs and the panels still are in excellent condition. Another has used a covering up to six or eight times, with considerable wear still remaining in it. The fabric materials are wear-resistant and if grommets and fastenings are handled with reasonable care, the covers will give a great deal of service, resulting in correspondingly decreased per-well cost of the cover.

Among the majority of operators, the use of covers is regarded as an insurance policy which will protect against the many damage suits which may be entered when drilling is undertaken in inhabited areas. The entire cost of the cover may be saved on one location alone should the well blow in with a spray of mud or oil and which would rain down on nearby homes or cultivated areas. During the early development of one Southern California town-lot field, an operator complained that he had repainted every house and garage in the neighborhood several times over, the damage resulting from lack of protection against occasional sprays of oil or salt water on adjacent structures.

Acid-Resistant

In addition to being protected against damage from flame, moisture, mildew or salt-laden air, the covering is immune from attack by acids commonly found in drilling mud. In the matter of sound deadening, the covers also play an important role. On some of the earlier models of this type covering, up to 85 or 90 percent of the sound of drilling operations was absorbed. Now, with improved materials available, recently introduced models having extra thickness, somewhat over 90 percent of the sound is killed. This sound-deadening characteristic alone is making possible the drilling of certain locations in Southern California which otherwise could not have been drilled. One of these wells referred to, and illustrated in Figure 1, was drilled in the heart of a business and residential district, the permit for which was granted only on condition that adequate sound-proofing be provided on the well. Wells currently being drilled near a Navy hospital are protected in a similar manner.

Openings to Order

Windows and doors are cut in the panelling to suit the particular requirements or desire of the operator. Ordinarily, panels do not come with door openings unless specifically ordered, and after installation on the derrick, they may be cut out and framed with light lumber. As shown in Figure 1, ladders and run-arounds are allowed to remain outside the covering if desired. On the rigs operated in the Arctic areas, however, ladders and platforms were installed inside the derrick covering to protect as much as possible the derrick man and to facilitate heating the interior of the rig.

Engine houses, pump shelters and any installations requiring sound-proofing or protection from the elements, also are easily covered with this improved covering. Even cellar sidings, through which come much of the noise of the rotary table, are enclosed. On many wells, however, it may not be necessary to cover all four sides of a rig. For example, on a certain well drilling alongside a major highway, covering was installed on only one side. In other instances, only two sides might be covered, depending upon prevailing winds and proximity of buildings or highways.

In the Rocky Mountain and Canadian areas where severe winter weather frequently shuts down drilling operations for days or weeks at a time, the covering holds promise of permitting operations to continue and without undue hardships for men and equipment. The insulation factor, K, (the ability of a substance to resist heat and cold changes) of the covering is approximately .260. This value may be compared with cork, for example, which has a K factor of .300; or ordinary lumber, which has a factor of .450. The lower the number, the greater the insulating properties.

Because of the many desirable qualities of the product, it is reasonable to assume that the oil industry will benefit in many ways through making it possible for an operator to drill when and where desired and with much less worry over the well's proximity to inhabited districts or its exposure to extreme weather conditions.

SHORELINE TREND MAY DEVELOP OKLAHOMA

Golden Horseshoe

By ANTHONY GIBBON
Staff Writer

A POTENTIAL shoreline sand reservoir along the western arc of the Pauls Valley uplift in McClain and Garvin counties of south-central Oklahoma may soon produce a "golden horseshoe" if present development of the area continues to link pools with closely correlated characteristics.

Results achieved by The Carter Oil Company and other operators in the area during the past year or so indicates the presence of a major Pennsylvanian sand stratigraphic trap trend along the rim of the uplift which may extend for some 20 miles, may average about two miles in width, and is expected to add from 50 to 100 million barrels of oil to Oklahoma's reserves. It definitely can be considered as an Anadarko Basin play; and results so far achieved have overshadowed other efforts to develop production within the boundaries of this major geological feature.

Although production has been found in the Hunton and Bromide zones (pre-Pennsylvanian) in several of the new strikes, the intriguing feature of the play revolves around the possibility that the rich, thick Pennsylvanian (Deese and Gibson) sands wedged against the western flank of the Pauls Valley Uplift may swing completely around the arc to form one continuous area of production. While this may be too much to expect, geologists are confident that much of the area, estimated at approximately 30,000 acres, may prove productive in either the Ordovician or Pennsylvanian measures, or both.

Reading counter-clockwise from north to south, pools along the potential golden horseshoe includes Southwest Wayne, (seven wells) producing from Hunton and Pennsylvanian; Southwest Maysville, a Carter discovery, (nine wells) producing from the Bromide (Ordovician); Southwest Antioch, (43 wells) producing from Pennsylvanian, with Bromide production a possibility; Northeast Elmore, (one well) and Katie (two wells) both pools producing from Pennsylvanian sands.

Six miles southwest of the Katie pool, Sohio Petroleum Company recently opened the Eola pool (one well), a Bromide producer. Northwest of the Southwest Maysville pool lies the Lindsay area which includes North Lindsay (seven wells), and East Lindsay (two wells), producing from Pennsylvanian, Hunton and Bromide. These pools may ultimately have an important bearing on the overall picture indicating long extensions of the shoreline sands westward towards the basin. Tests between the Southwest Maysville and Lindsay areas should prove exceptionally interesting and if productive, would undoubtedly result in long westward step outs.

While not directly tied into the so-called "golden horseshoe" trend, other McClain County operations in the general area include the Washington (five wells), Iron Chapel (one well), and Blue Hill (one well) pools, precursors of the current development. These operations have proved disappointing, although they provoked considerable speculation due to the interest focused on the Anadarko Basin.

79 Producers

There are 79 producing wells in the general area, including the disappointing McClain County developments. In that connection it is interesting to note that the single well in the Iron Chapel pool is the second deepest mechanically produced, or pumping well, in the Country. In the Bromide, the well is pumped from 10,700 feet and produces approximately 100 barrels per day. Production is expected to be stepped up when larger diameter tubing is installed. Dry holes to the north and south of the lone producer condemned the area, limiting production to a very restricted zone. The area in the general vicinity is highly faulted.

Despite the poor showings of the McClain County wells, Carter's activities in that section which started nearly two years ago, sparked the play which later moved southward and resulted in the current activity around the Pauls Valley Uplift.

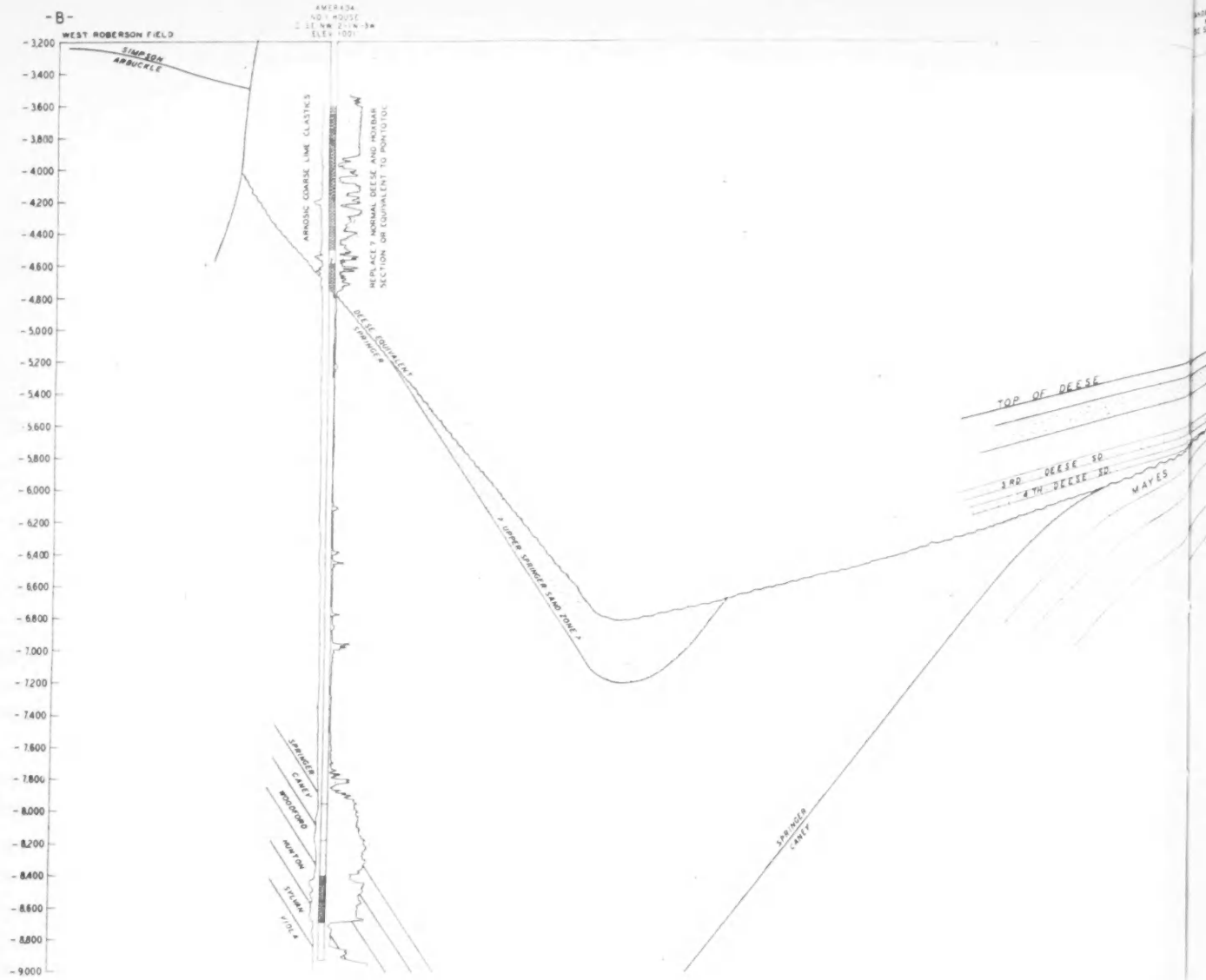
Carter's Cottingham 1, in 4-7n-3w, which opened the Washington pool in May, 1944, was heralded as the first major oil discovery in the Anadarko Basin. It was completed through perforations between 10,635-50 feet for 297 barrels of oil per day. The well drilled to 11,209 feet, cost $350,000. The prospect was based on seismic work which outlined a closed structure.

Fourteen wells were drilled, of which seven were producers—four in the Bromide and three in the Hunton. The wells were drilled on 160-acre locations. An evaluation of the project which proved an expensive operation prompted Carter to release much acreage under lease at the end of last year with slim hopes that the venture will result profitably.

Meanwhile more encouraging results were being achieved farther south in the Lindsay area where Cities Service Oil Company's Lawson 1, in 22-5n-4w, McClain County, opened Bromide production in August, 1945. Aiming to tap the same objective horizons which were encountered in the Washington area, the Lawson 1 was perforated at 10,943-90 feet, with an initial flow of 852 barrels of oil daily through choke. Subsequent wells proved that while the producing zones to the north averaged about 30 feet in thickness, the same horizons in the southern sector of the area averaged between 125 to 200 feet. In addition to the Bromide, the Hunton and Pennsylvanian zones also are productive at Lindsay.

In the East Lindsay pool an active drilling campaign is under way with eight rigs running. Magnolia Petroleum Company and Carter each has a wildcat and the productive area is estimated to cover approximately 6000 acres. The geologic picture is predicated on a seismic high. Much faulting exists in conjunction with folding. The folding is aligned with, and possibly is an extension of the Pauls Valley Uplift.

The new Eola pool in Garvin County is another interesting structural prospect in the general trend. It was opened by Sohio's Howard 1 in 17-1n-2w, drilled at a cost of $360,000. The structure was predicted by Sohio's geological department and corroborated by seismograph. The well was completed early this year for 1320 barrels of oil per day from the



Bromide between 10,094-234 feet. The theory that producing zones would thicken toward the south was further substantiated by the results obtained at Howard 1, where approximately 150 feet of saturated Bromide sand was logged as compared with an estimated 30 feet in the Washington pool of McClain County, 35 miles north.

Though seismic evidence of closed structures has played an important role in the current development, the real interest in the Pauls Valley Uplift area lies in the stratigraphic trap possibilities. Unreflected at the surface, and without adequate exploratory tools to locate them, delineation of stratigraphic traps presents a challenge to geologist and geophysicists alike.

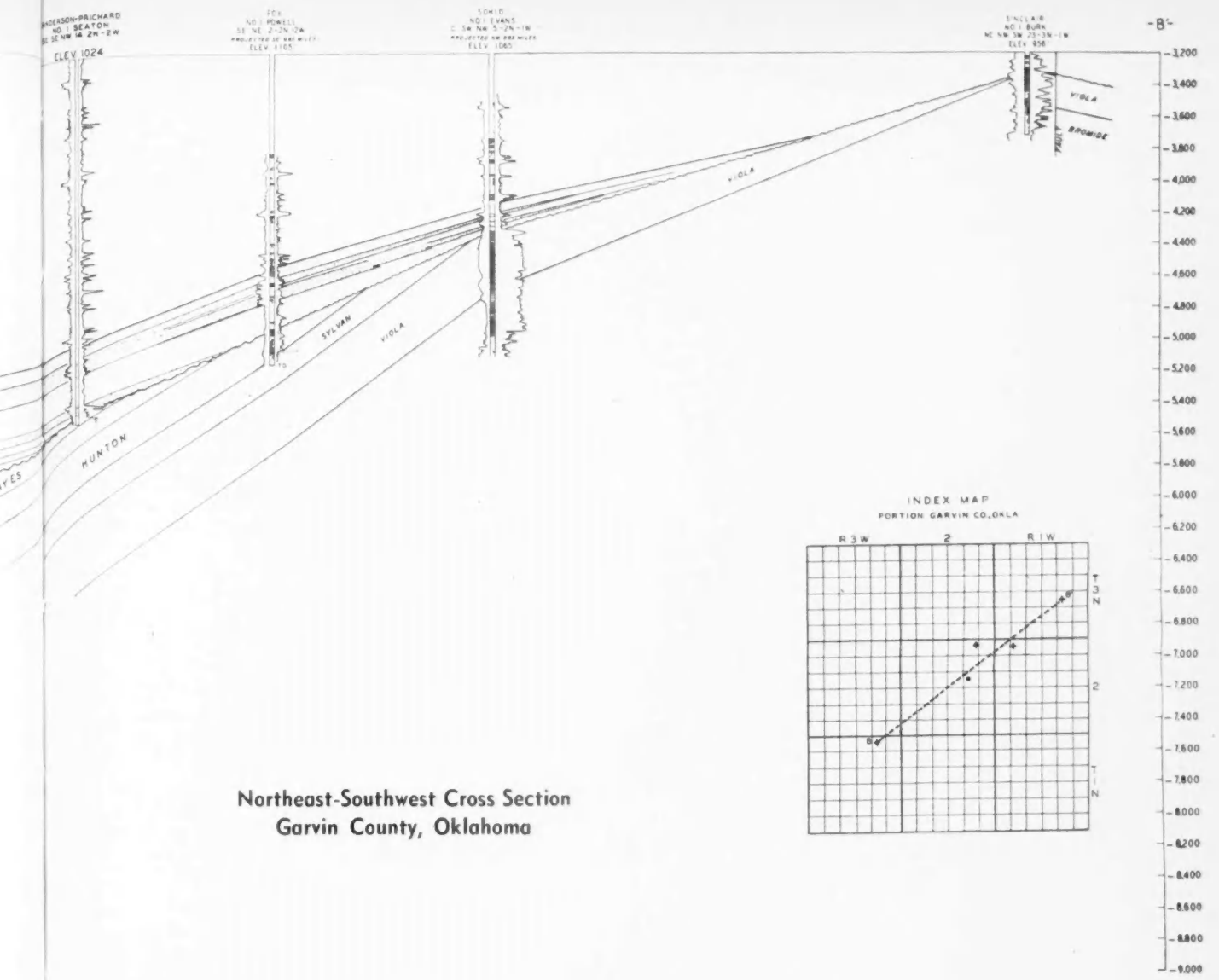
In the Pauls Valley Uplift area geologists had strong reason to suspect the presence of shoreline sands wedged against the flanks of the uplift; however, primary drilling was projected toward the deeper Ordovician measures structurally reflected by the seismograph. Early wells found the Ordovician dry and plugged back to the Pennsylvanian for production.

The existence of thick, prolific Deese (Pennsylvanian) sands occurring stratigraphically along the western arc of the Pauls Valley Uplift was proved a little more than a year ago when the Globe-Vickers Gibson 1 in 30-3n-2w, Garvin County, located on a surface anomaly, flowed oil and gas on drill-stem test from the Deese at 6520-53 feet. Operators were satisfied that they had correctly interpreted the structural picture and proceeded to the Bromide only to find that zone dry at a total depth of 7775 feet. The well was plugged back and perforated in the Third Deese or Gibson zone and was completed for 57 barrels in five hours through 10/64-inch choke.

The well opened the Southwest Antioch pool, which developed rapidly and now has 43 producers and two dry holes, one on the downdip. The other failure missed the Gibson sand on the updip but was taken to the Bromide, where that sand appears productive.

The field has not yet been defined on the north and south but the Gibson or, as it is sometimes called, Third Deese sand, is approximately 1½ miles wide. A wildcat between the Northeast Elmore and Katie pools is expected to shed important light on the Southwest Antioch area. If successful, the test will link not only the Northeast Elmore and Katie pools, but also will undoubtedly stimulate drilling between Northeast Elmore and Southwest Antioch in an attempt to link both areas and establish the existence of the productive Deese shoreline for another eight miles or more around the arc of the Pauls Valley Uplift.

With the discovery of Southwest Antioch all geologic and seismic data were brought up to date and companies began to acquire acreage at the contour position of the discovery to the southeast flank of the uplift for as far as ten miles. Carter negotiated with W. A. Delaney and Zephyr Drilling Company and drilled Burford 1 in 5-1n-1w, Garvin County, about 8½ miles southeast of the South-



Northeast-Southwest Cross Section
Garvin County, Oklahoma

west Antioch discovery. The well found what proved to be the same sand as in Southwest Antioch at 6070-89 feet, also carrying oil. The original obligation called for a well to the Bromide since Delaney and Zephyr had mapped a surface anomaly and felt that the so-called structure should be completely tested. The Bromide proved dry at 7905 feet, total depth, and the well was plugged back and completed in the Deese sand for 463 barrels of 40-gravity oil in 24 hours to discover the Katie pool. For Carter, that was the first outright stratigraphic trap wildcat ever planned, drilled and found productive in Oklahoma.

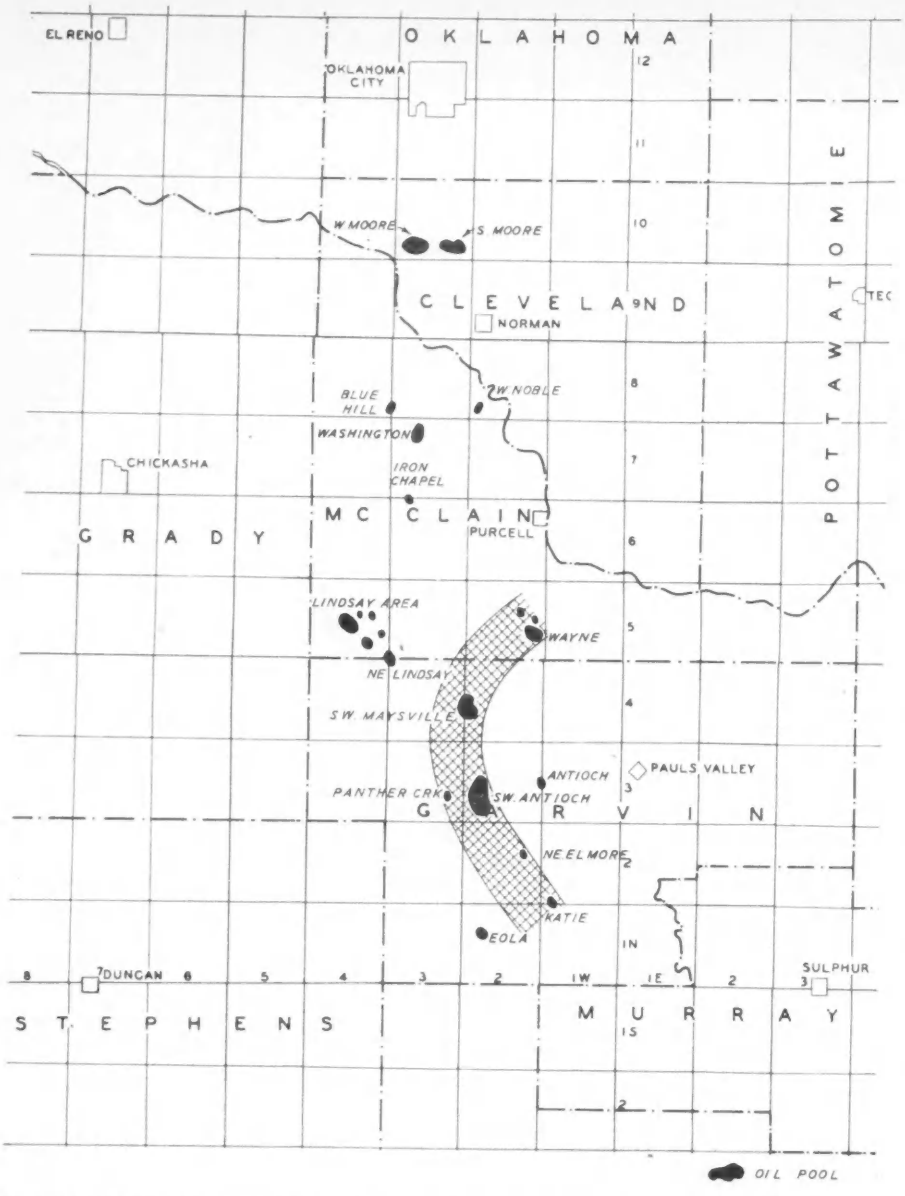
Three Katie Completions

Three wells have been completed at Katie. Following the discovery, Anderson-Prichard Oil Corporation found the Third Deese sand productive at Seaton 1 in 14-2n-2w, and completed for 900 barrels of oil per day through perforations at 6424-54 feet.

Last December, Carter & Vierson went back into Hart 1 in 23-3n-3w, Garvin County, an old well which had been abandoned without running electrical log or drill-stem test in the belief that it was bottomed in the same Deese section producing at Southwest Antioch and because oil staining had been found in the samples. Electrical log proved the correlations correct but the drill-stem test recovered mud only. The well was then deepened and after drilling five feet the Fourth Deese sand was encountered from 7184-222 feet and flowed distillate and gas on drill-stem test. The well was taken to the Hunton, which proved dry, and then was plugged back and completed in the distillate (Fourth Deese) zone for 70 barrels of 59-gravity distillate and 1½ million cubic feet of gas to open the Panther Creek pool.

Concurrent with the discovery of the Southwest Antioch pool, R. H. Dearing of Dallas was drilling McBride 1 in 30-4n-2w, Garvin County, located about six miles north and a little west of Southwest Antioch, where it was observed that the Deese section checked very closely with Southwest Antioch. When the Third Deese sand was encountered at 6564-92 feet it carried oil staining and on drill-stem test gas and distillate were recovered. The well was completed in the zone for 194 barrels of 65-gravity distillate plus 2½ million cubic feet of gas to open the Maysville pool.

To Carter goes credit for developing Bromide (Wilcox) sand production at Maysville with the Eskridge 1 in 19-4n-2w, completed for 45 barrels of oil per hour through ½-inch choke at 7400 feet, total depth. Carter took the spread on shooting based on the Viola, a horizon which reflected a structure on the Bromide. Location was made at a point where the drill would penetrate the Bromide at a high level, yet low enough on the Deese to produce oil rather than gas and distillate. The theory worked well insofar as the Bromide sand was concerned but the Third Deese was hard, tight, and poorly developed. The Bromide was topped at 7205 feet and found to be 198 feet thick, with a distillate column 162 feet thick, leaving only 36 feet of oil sand above the water level. Subsequent drill-



Scene of Oklahoma's hottest stratigraphic trap play where several important Pennsylvanian sand strikes lead geologists to believe that a major oil reserve is in process of development along the western arc of the Pauls Valley Uplift. Cross-hatching shows the trend shaped like a horseshoe.

ing has shown that all the sand is intercommunicating and low wells produce oil only.

The Maysville structure is faulted on the east, thus accounting for three dry holes drilled. Two of the failures are Deese sand wells but that horizon is expected to produce prolifically as development progresses downdip. The Texas Company is encountering good production in its development of this sand on the southwest edge of the pool.

At the time Carter was completing the Eskridge well to open the Southwest Maysville pool, Big Chief Drilling Company completed the Stephens 1 in 25-5n-2w, in the Fourth Deese sand at 6533-66 feet, initial production 236 barrels of 42-gravity oil in 13 hours through ¼-inch choke. This well opened the Wayne pool and revealed that the stratigraphic sand belt was present about seven miles to the northeast, forming, as it were, the northern prong of the so-called "golden horsheshoe," with the Katie pool to the south as the southern prong of the arc.

Thus, Deese sand production has been developed along the western flank of the Pauls Valley Uplift for about 30 miles. While it is true that production to date is represented by a chain of separated pools, subsequent drilling in the near future may link up the producing areas to present a solid chain which may prove one of the country's most important stratigraphic trap reservoirs.

But what of the economics of the current play? Will the oil recovered justify the expensive and hazardous drilling incident with the development?

Petroleum engineers familiar with the situation believe that the "golden horseshoe" when it is fully developed, will pay off. However, there are certain factors to be considered. Strict conservation and uniform well spacing should be enforced.

The play indicates that wells may cost anywhere from $90,000 to $360,000 each. It is obvious that such costs make close well spacing uneconomical. A 40-acre spacing pattern has been adopted for Deese sand zone wells which average about $90,000 to drill. Wider spacing is necessary where costs are greater.

Another factor that must be considered is that less oil will ultimately be recovered from the deeper than from the same shallower sands found in other parts of Oklahoma due to shrinkage of the oil from the reservoir to the stock tank. This factor should be considered in estimating ultimate recovery and every effort should be made to maintain primary energy. In none of the areas was there evidence of energy waste; there was no gas flares and only the best equipment was used to assure maximum efficiency.

Typical Deese sand wells are expected to produce individually about 124,000 barrels of oil which, at today's market, would be worth approximately $230,000. Deducting $90,000 drilling costs, $30,000 to royalty owners and $10,000 for taxes, operators should expect to gross about $100,000 per well. This is a "curbstone" estimate only and is based on the writer's own observations. Changing conditions could alter the picture for good or ill; on the whole, however, the "golden horseshoe" should result in a golden harvest for its developers, as well as for royalty owners and the state.

Writers Get Preview

Preview of this potential golden horseshoe was afforded news editors during a recent tour of the area as guests of Carter.

The trip started from Oklahoma City and covered approximately 150 miles, touching the Katie, Eola, Northeast Elmore, Southwest Antioch, Southwest Maysville, Lindsay and Iron Chapel pools, and stopping briefly to inspect key wildcats now drilling. O. C. Schorp, president of Carter, headed a group of company officials for whom the trip primarily was planned. Hugh R. Shannon, division superintendent, conducted the tour, while R. S. Hecklin, division exploration manager, and Dr. J. J. Mullane, Carter petroleum engineer in the Tulsa office, described geological and engineering features of the operations.

Carter has a heavy stake in the area, where many majors and independents are now active. According to company officials Carter, which has drilled 28 wells and opened several new pools, has spent more than $5 million and expects to have twice that amount invested with a total of 75 wells by the end of this year or early 1948.

Pipe Lines of the U. S.

Socony-Vacuum Oil Company (White Eagle Division)

15th of a Series

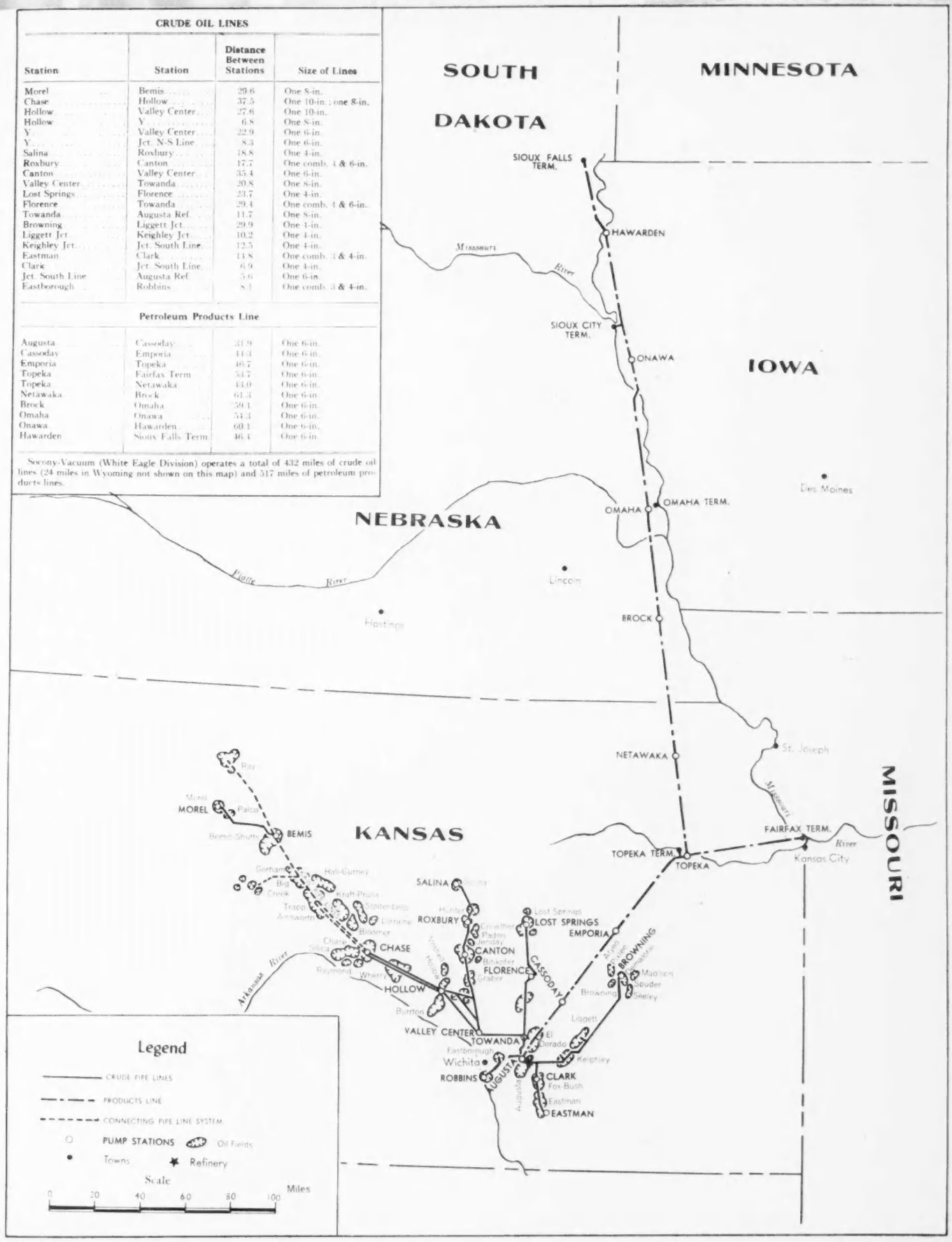
CRUDE OIL LINES

Station	Station	Distance Between Stations	Size of Lines
Morel	Bemis	29.6	One 8-in.
Chase	Hollow	37.5	One 10-in.; one 8-in.
Hollow	Valley Center	27.6	One 10-in.
Hollow	Y	6.8	One 8-in.
Y	Valley Center	22.9	One 6-in.
Y	Jct. N-S Line	8.3	One 6-in.
Salina	Roxbury	18.8	One 4-in.
Roxbury	Canton	17.7	One comb. 4 & 6-in.
Canton	Valley Center	35.4	One 6-in.
Valley Center	Towanda	20.8	One 8-in.
Lost Springs	Florence	23.7	One 4-in.
Florence	Towanda	29.4	One comb. 4 & 6-in.
Towanda	Augusta Ref.	11.7	One 8-in.
Browning	Liggett Jct.	29.9	One 4-in.
Liggett Jct.	Keighley Jct.	10.2	One 4-in.
Keighley Jct.	Jct. South Line	12.5	One 4-in.
Eastman	Clark	13.8	One comb. 3 & 4-in.
Clark	Jct. South Line	6.9	One 4-in.
Jct. South Line	Augusta Ref.	5.6	One 6-in.
Eastborough	Robbins	8.1	One comb. 3 & 4-in.

Petroleum Products Line

Augusta	Cassoday	31.9	One 6-in.
Cassoday	Emporia	41.3	One 6-in.
Emporia	Topeka	46.7	One 6-in.
Topeka	Fairfax Term.	56.7	One 6-in.
Topeka	Netawaka	43.0	One 6-in.
Netawaka	Brock	61.3	One 6-in.
Brock	Omaha	59.1	One 6-in.
Omaha	Onawa	54.3	One 6-in.
Onawa	Hawarden	60.1	One 6-in.
Hawarden	Sioux Falls Term.	46.4	One 6-in.

Socony-Vacuum (White Eagle Division) operates a total of 432 miles of crude oil lines (24 miles in Wyoming not shown on this map) and 517 miles of petroleum products lines.



Doubling Shaft Operating Life By Metallizing and Truing

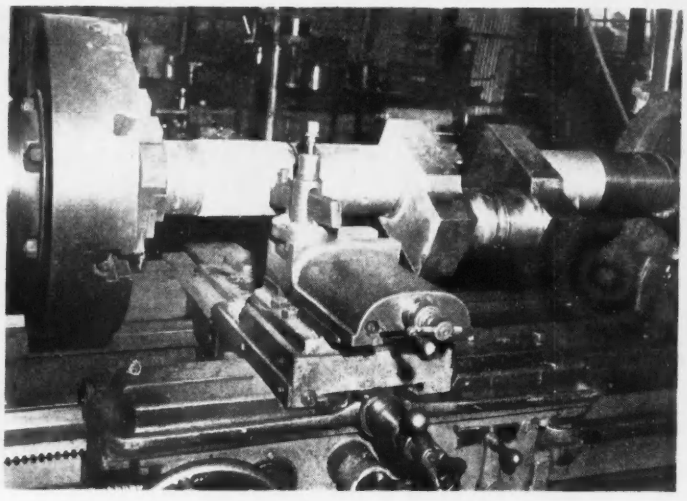


Figure 1. The stub end which carries the overhung fly wheel has been cleaned up, turned to size, and metallized. The tool is now bringing the stainless metal coat down to predetermined hub diameter plus calculated over value to insure desired fit. The "dutchman" in the keyway is under the tool, but is completely masked by the sprayed metal.

By ELTON STERRETT
Engineering Editor

COMPRESSORS for repressuring and recycling plants must operate over long periods without shutdown, and even when a spare unit is provided in an installation, the down time allowed each is not sufficient for major overhaul. On one such project, the angle-type compressor units had an operating history of approximately ten years, with time out only for such maintenance operations as valve reconditioning, bearing adjustment and the occasional tightening of a fly wheel which—for some reason—seemed to work loose on the shaft stub end, despite the otherwise satisfactory running balance of the units.

During the ten-year period, as fly wheel looseness developed, the first step was to pull down on the bolts through the split hubs, in the attempt to clamp the hub more tightly around the shaft and thus eliminate the trouble. So tightly were some of the bolts pulled down that integrally-cast spokes were pulled loose from the rim in the heavy cast wheels, due to the tension set up by the four bolts being transmitted through the half-hub to the smallest section of the spokes which, as is usual in fly wheel design, was near the rim.

These broken or cracked fly wheels were, of course, replaced with new ones, but no attempt was made to restore the shaft stub to its original condition. At the end of the ten-year period it was decided to overhaul each of the battery of compressors throughout, and arrangements were made to work on the units in series, continuing to operate all save the one actually undergoing rehabilitation.

To provide for metallization in a plant which was compressing gas, a channel or tunnel was established across the station building by stringing parallel wires, over which were hung overlapping tarpaulins. This was in effect a wind or suction tunnel, in which a fan was set up on the plant side of the shaft to exhaust gases toward the plant. Guards with fire extinguishers were posted on each side of the job. The shaft of the unit under reconditioning was stripped of its rods, and then revolved by means of a motor through a gear speed reducer. Connection to the end of the shaft was through two stud bolts attaching a drive collar to the unit so that the entire area supporting the fly wheel could be cleaned up, turned, and metallized.

Experiments with metallizing work brought out the comparative absence of fire hazard from the sparks produced so profusely as metal is sprayed. The only ignition possibility lay in the chance of a short slug of the wire being blown free by the oxygen blast, in which case ignition temperatures might be generated in the immediate vicinity of the slug.

After work had been completed on one shaft in the compressor station, it was decided to pull the remaining shafts, sending them to a machine shop for complete reconditioning. The shafts were lifted free of the bearings, firmly fastened to heavy skids to eliminate possibility of overstressing or even distortion of the shaft during the trucking operation, and the work then done on a lathe with bed capacity sufficient to support the entire unit.

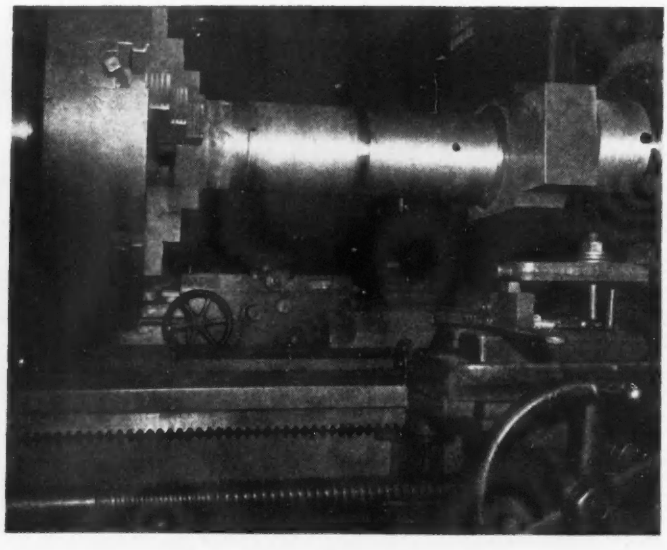


Figure 2. The builtup area has been turned down to the diameter required by the fly wheel hub. Since this is a compression fit, a surface fit for a bearnig is not required, as may be noted by comparing areas across the land between outboard bearing and fly wheel stub. The collar used for supporting and driving the shaft in the lathe appears to the left of the ridge of sprayed metal edging the fly wheel space.

Since the principal operation was the refitting of the fly wheels, the hubs of these units were first bored out until a true, concentric bearing surface had been obtained. Although the cast metal of the hubs had not been reduced to the extent of the shaft stubs, a finishing cut was necessary to dress out the inequalities in every instance.

Preparation of the shaft for metallizing included some steps which were designed especially toward eliminating every possibility of contamination of the surface onto which the build-up metal was to be sprayed. The keyway was thoroughly cleaned by mechanical means

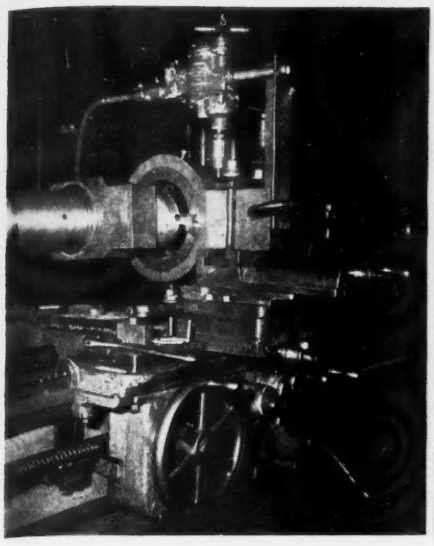
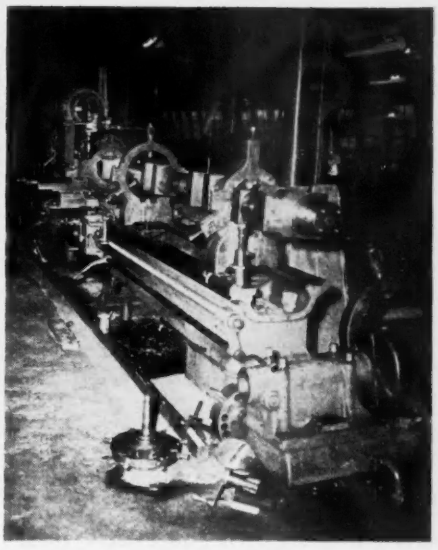


Figure 3 (left). The air-driven mechanism developed for truing crank throws. The tool-carrying unit is split, formed from three parts, and assembled around the pin so that the partings in the three sections are staggered and not more than one is in contact with the vertical worm drive at any one instant.

Figure 4 (right). Method of supporting long shaft on lathe bed, showing use of two steady rests, as well as one of the small screw jacks utilized to take up possible rotation of the shaft under the drag of the tool in the truing machine. In the stub end of the shaft may be seen the holes to accommodate the driving flange used in the lathe face plate.



first, and then given two or more swabbings with carbon tetrachloride before fitting the "dutchman" or filler which was driven lightly into the groove to fill it completely over the area to be metallized. This step not only provided a smooth surface over which the lathe tool might operate in truing up the stub, but also prevented sticking of the sprayed metal in the groove. The filler also prevented chipping or crumbling of the edge under the tool, either on the cleanup operation or when the sprayed metal was being turned to size.

The shaft end was cleaned up by turning down until all trace of the former reduced areas had been removed, and the usual roughening cut run over the area to be rebuilt. As soon as this operation was completed, the spray gun was mounted on the tool post, and Type 302 stainless steel sprayed on until the buildup was sufficient to permit turning to reduce the diameter to approximately 0.001-inch per inch of diameter more than the finish bore of the flywheel.

Turning the stub to slightly more than the flywheel bore required the use of wedges in the slots of the hub to enable it to be placed on the shaft as the compressor unit was rebuilt, but this plan enabled the four hub bolts to be brought tight under desired torque without overstressing the hub casting or setting up tension which would be transmitted through the hub to the reduced cross-sectional area of the spokes.

The rod and main bearings of the shaft were also reconditioned while the unit was mounted in the lathe, and diameters brought to a standard corresponding to the minimum calibration required after cleaning up any scored, flat or otherwise out-of-round areas on any bearing.

The turning operation on each crank throw was carried out by an air-driven unit mounted on the lathe cross slide. The tool was carried in a mounting attached to the side of what was the hub of a worm drive, with provision made for clamping the tool on either side of the hub so that the entire area of the bearing could be cleaned up simply by shifting the tool from one position to the other. The worm gear and the two side plates which carried the tool post were each split to permit assembly around the pin to be turned, with clearances and partings closely computed to reduce play and possibility of vibration.

Since the fly wheels were tightly clamped to the shaft stubs at the time the compressors were erected in the station, no play or motion was possible between the hub and shaft to cause abrasion of the metal between the two, without which no play could develop. Yet when the wheels were pulled, the shafts were found to have well developed areas where the shaft was under diameter sufficiently to be measured, and the low areas were discolored and evidently corroded. By reference to Figure 5, in which the areas of corrosion are located with respect to the keyway and bearing surface of the hub, it may be noted that the areas lie at approximately 45 degrees from the diameters drawn through the keyway and at right angles thereto. By further reference to the type of split hub used on the flywheels, it appears that these areas approximately coincide with the areas where the split hubs would apply maximum — and concentrated — pressure on the shaft. This hypothesis of pressure application is borne out by the location of those flywheel spokes which fractured under tension when first attempts at correcting incipient looseness led to even greater pressure being placed on the hub bearing points by pulling down still further on the hub bolts.

Study of the residual metal in these areas where wastage occurred would indicate that the trouble was caused by concentrated stress setting up areas conducive to stress corrosion, and that this phenomenon was responsible for the first loosening of the fit between flywheel and stub, after which pounding as the wheel vibrated in service easily could add to the wear, and at the same time tend to convert the pure products of corrosion in the affected areas to those which easily might be interpreted as being metal which was first pulverized by the abrading action of wheel on shaft, and then converted to corrosion products by moisture which found its way into the area after looseness had developed.

The use of a shaft which is slightly larger than the bore of the hub is expected to eliminate the areas of concentrated stress, and to distribute the compression load applied by the hub bolts over a much greater proportion of the projected shaft area that was obtained in the earlier setup.

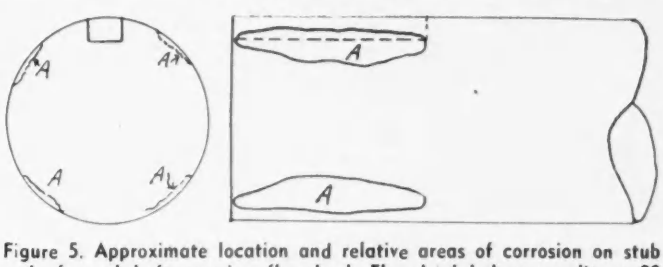


Figure 5. Approximate location and relative areas of corrosion on stub end of crankshaft carrying fly wheel. Fly wheel hub was split at 90 degrees from keyway, areas of greatest corrosion were at 45 degrees to keyway and hub split.

Photographs of the shop shaft reconditioning were taken through courtesy of Forsyth Engineering Company, Houston; while metallizing and corrosion data were received through Joe Young, the Metallizing Company of America, Houston.

SELECTIVE PLUGGING BY

Chemical Methods

By DR. H. C. LAWTON

MANY advantages are to be gained by selective plugging of certain sands in secondary recovery operations. One advantage is the decrease in bypassing through the more pervious sands already flooded out, with resultant decrease in water production and lowered pumping costs.

A similar advantage is to be gained in decreased bypassing in gas-air flood areas by sealing off the thief sands carrying most of the gas but producing little or no oil. As a result of plugging the pervious sands, the water or gas is directed into the less permeable sands at the same or at an increased rate, depending upon pressures, in many cases with resultant increase of oil production from these sands. The plugging of unproductive sands in producing wells to decrease water production also can be carried out. This phase of the problem has been widely discussed in many publications. Other applications for chemical plugging agents are the sealing off of stray water-bearing sands or caving formations encountered during drilling operations in gas or oil wells. Such applications can and have saved using long strings of casing, especially in cable tool drilling, with the advantage gained from the larger size hole drilled into the productive horizon.

The term "selective plugging" as used herein is defined to mean that flow of the plugging chemical is directed into predetermined strata isolated by positive means such as the use of packers and bridges. In other words, the formation is isolated by packers or other suitable means and the treating agent directed thereinto rather than letting the plugging agent seek out the strata to be plugged as in customary emulsion plugging work practiced in the water flood areas.

Many articles have been published on chemical plugging of sands in both primary and secondary recovery operations. Recently H. T. Kennedy summarized use of plugging agents in secondary recovery operations. Agents employed include finely powdered solids . . . such as cement, colloidal clays, and wax distillates . . . added to the water in flooding.

Yuster and Calhoun[1] have summarized the work in plugging of oil sands applicable to secondary recovery operations up to 1944. Of particular interest is their discussion on the use of wax distillates. Wax distillates, emulsions, and other plugging materials which form a filter cake on the sand face cannot be used in producing wells and many times break through even in input wells. Use of emulsions prepared from other materials is at present being tested through the cooperation of one manufacturer with operators in the Bradford and Allegheny fields for purposes of reducing permeabilities in water input wells. Progress on plugging with this emulsion is progressing successfully and results will be published shortly. The work discussed here has been carried out with chemical plugging agents which set up to hard solids in the sand after a predetermined time. Though these chemicals are more expensive, the excellent results attained by similar methods in other areas appear to warrant their extra cost. In fact, the emulsion and chemical methods of treatment are not competitive, but are in reality complementary; that is, the methods are each inadequate in exactly the type of treatment where the other method is most suitable.

Many chemicals have been used to plug water- and gas-bearing strata and their use is described in the literature. Paul D. Torrey[2] and Lehnhard and Reimers[3] have discussed the use of gel-forming agents for plugging gas and oil wells. Kennedy[4] has summarized the results of typical chemical treatments with gel-forming agents for reduction of gas- and water-oil ratios by the plugging of selected portions of the producing formations, and states that similar treatments are applicable to cable tool drilling wells to shut off excessive water. Miller[5] has discussed the application of plastics to many types of jobs. Hefley and Cardwell[6] have summarized the results of 225 jobs using plastics in plugback jobs, principally in East Texas fields. George Weber analyzed the use of plastics in shutoff work in 1888 jobs during the period 1943-1946 and states that of these 62 percent of the plugback jobs employing plastic succeeded in shutting off all water, 16 percent resulted in partial reduction in water production, and 19 percent failed to improve the oil-water ratio.

The work reported herein was carried out both in the laboratory and in experimental field treatments with silicic acid gel-forming mixtures[7,8] mentioned above and with a urea-formaldehyde resin-forming mixture.[9,10,11] The work carried out is, therefore, the application of known chemicals and methods to specific conditions encountered in the Pennsylvania Grade area.

TABLE 1

Time Required for Gel Formation for Silicic Acid Gel-Forming Mixtures

MIXTURE NUMBER	Volume 8N H_2SO_4 Used, Ml.	Volume Water Used to Dilute Acid ml.	TIME REQUIRED FOR GEL FORMATION		Remarks
			Minutes	Hours	
1	20.0(0)	20.0(0)	0	0.	Gelled while mixing.
2	21.5(5)	18.7(5)	481	8.0	
3	22.5(0)	17.5(0)	810	13.5	
4	23.7(5)	16.2(5)	814	13.6	
5	25.0(0)	15.0(0)	690	11.5	
6	26.2(5)	13.7(5)	540	9.0	
7	27.5	12.5	516	8.6	
8	30.0	10.0	345	5.8	
9	32.5	7.5	226	3.8	
10	35.0	5.0	186	3.1	
11	37.5	2.5	140	2.3	
12	40.0	0.0	97	1.6	

Pertinent Facts: 70 ml aliquots of dilute silicate solution prepared by diluting 4 volumes of "N" Brand Silicate of Soda with 3 volumes of water were used in all tests.
Mixture No. 5 contains 12.2 percent SiO_2 by weight.
Temperature = 57.5° to 62.5° F.

Experimental Work

A. Laboratory Experiments

The experimental work may be divided into two parts; (1) the use of silicic acid

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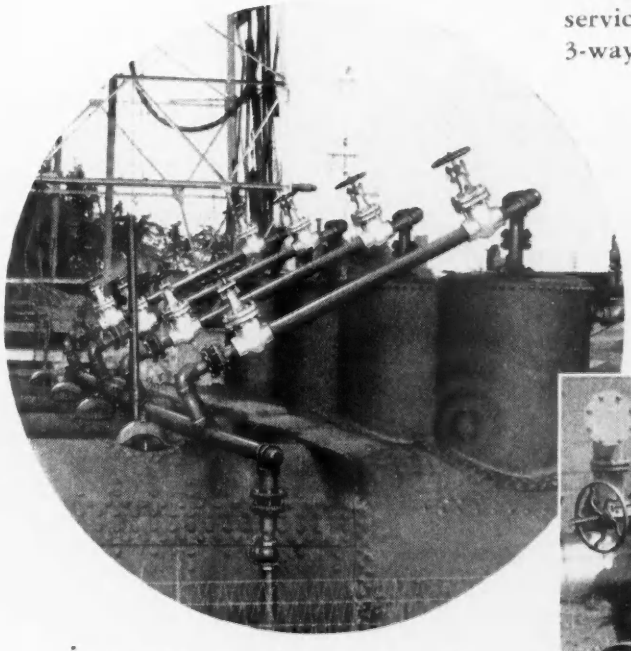

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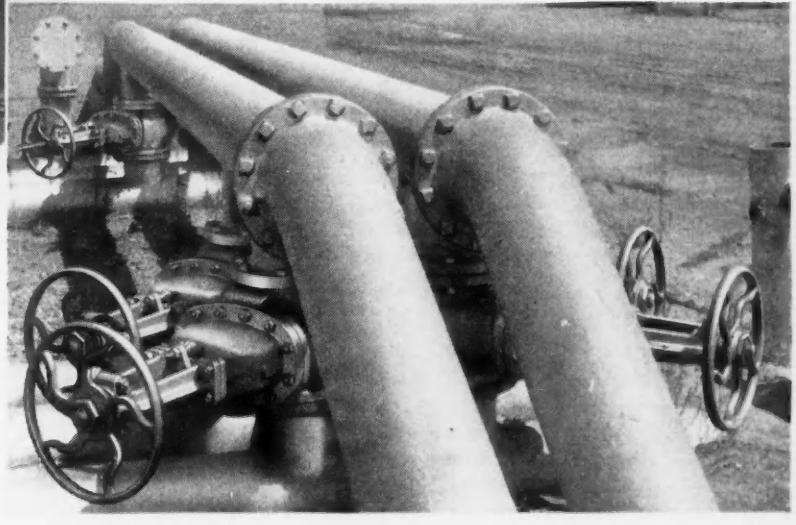

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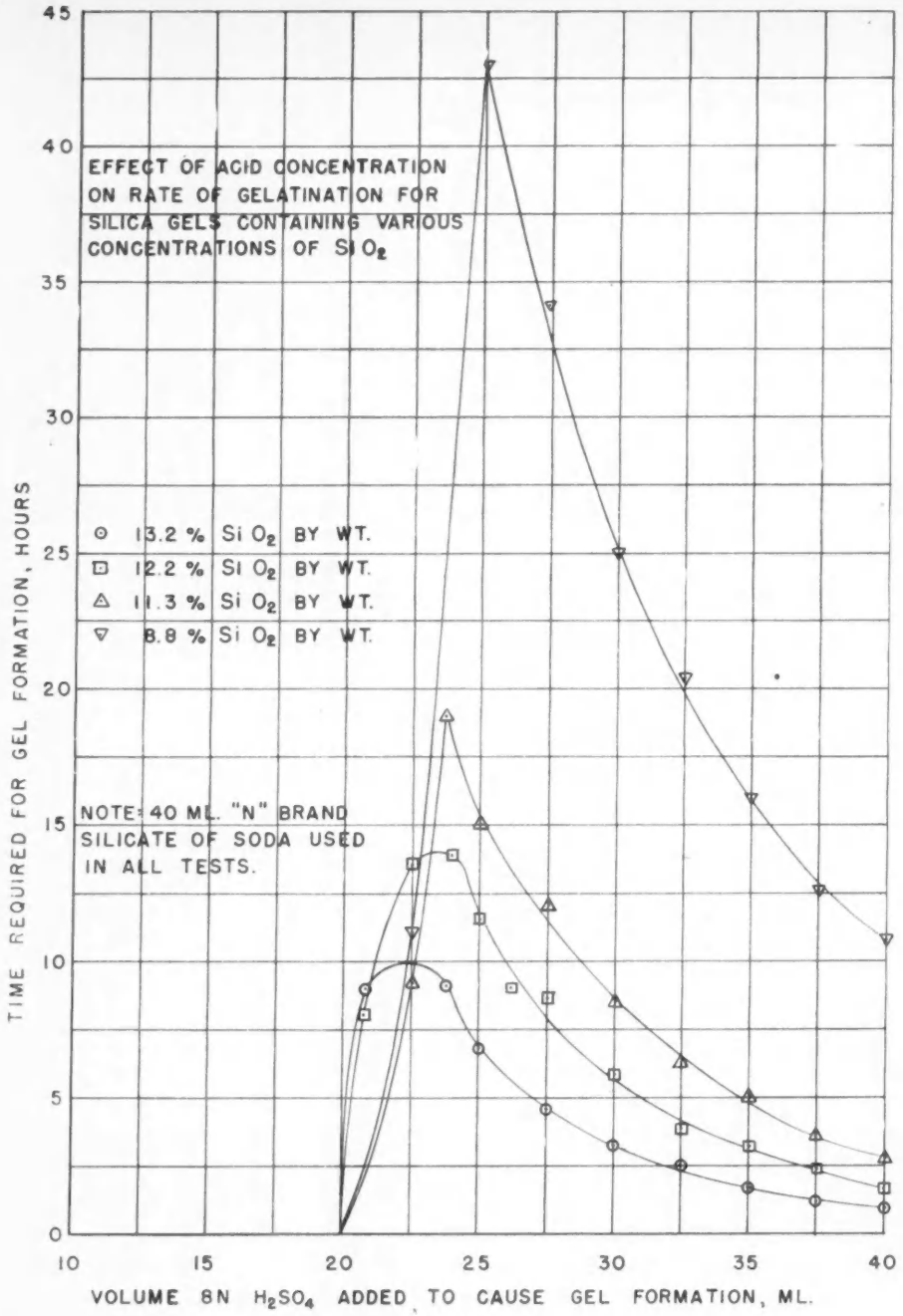
EFFECT OF ACID CONCENTRATION ON RATE OF GELATINATION FOR SILICA GELS CONTAINING VARIOUS CONCENTRATIONS OF SiO_2
13.2 % SiO_2 BY WT.
12.2 % SiO_2 BY WT.
11.3 % SiO_2 BY WT.
8.8 % SiO_2 BY WT.
NOTE: 40 ML. "N" BRAND SILICATE OF SODA USED IN ALL TESTS.
TIME REQUIRED FOR GEL FORMATION, HOURS
VOLUME 8N H_2SO_4 ADDED TO CAUSE GEL FORMATION, ML.
0
5
10
15
20
25
30
35
40
45

FIGURE 1

gel-forming mixtures; and (2) the use of urea-formaldehyde resin-forming mixtures.

Before undertaking studies with silica gel-forming mixtures a review of the available literature on this subject was made. Hurd[12, 13, 14, 15] and his co-workers have carried out extensive studies with silicic acid gels. They determined the effect of acid concentration at constant silica concentration, the effect of silica concentration at constant acid concentration, and the effect of temperature at constant silica and acid concentrations on the time of gelatination. They also have studied the effect of the several strong mineral acids on the time of set of gels. The effects of the strong acids are similar to each other but the times for gelatination vary slightly depending on the anion present, i.e., sulfate, chloride, nitrate, and phosphate. Davis and Hay[16] carried out similar studies with silicic acid gel-forming mixtures except that the silica and acid concentrations were greater than those used by Hurd and his co-workers. Davis and Hay found that in the acidic regions a small excess of hydrochloric acid causes a steep rise in the setting time to a sharp maximum and that all of the acids (HCl, H_2SO_4, and H_3PO_4) produce rapidly-setting gels in strongly acidic systems. It, therefore, appeared that gel-forming systems similar to those described by Davis and Hay offered the greatest promise as possible plugging agents.

Although many types of mixtures are reported in the literature, these do not appear applicable for plugging purposes. Therefore, it was first necessary to determine the composition of mixtures of sodium silicate and sulfuric acid that have the required interval between mixing and setting to allow injection into the well. Results typical of those obtained are presented in Table 1 for a gel-forming mixture containing 12.2 percent silica (SiO_2) by weight. The gel-forming mixtures were prepared by slowly adding the indicated volume of dilute silicate solution to the acid mixture with vigorous stirring furnished by a small electric stirrer. The mixture was considered to have set when the mixture failed to flow, even though the surface was distorted, when the container was held at an angle of 45 degrees to the horizontal. All gel-forming mixtures were prepared and tested in this manner.

The data presented in Table 1 are shown graphically in Figure 1 together with similar data for gel-forming mixtures containing 8.8, 11.3 and 13.2 percent SiO_2 by weight. These curves are similar in shape to those described earlier by Davis and Hay. The curves in this figure show the effect of acid concentration on the setting time at constant concentration of silica as well as the effect of concentration of silica upon setting time. The sharp increase in setting time from a zero setting time to a maximum value with small addition of acid is pointed out. After the maximum is reached, a slow drop-off in the setting time with further addition of acid takes place. These curves are incomplete. In the region to the left of the zero setting time these curves must of necessity again rise to an infinite set time for the dilute silicate solution. This portion of the curve has not been investigated. Obviously, it is impractical to work with mixtures in the rapidly rising portion of the curve because small differences in composition might cause immediate or premature setting of the gel. It is advisable, therefore, to choose a composition to the right of the maximum. A mixture considered suitable for field application contains 12.2 percent SiO_2 by weight. Gels containing higher concentrations of SiO_2 are extremely difficult to prepare free of lumps while gels containing smaller concentrations of SiO_2 require too long set times. Similar studies have been carried out using other brands of sodium silicate and various strong acids.

Effect of Silica Concentration

The curves in Figure 1 show the effect of concentration of silica on the time of set. When the maximum set time for each concentration of silica is plotted as a function of silica concentration, the logarithm of the time of set is a linear function of the silica concentration in

the range studied, i.e., 8.8 to 13.2 percent SiO_2.

The composition and properties of dilute silicate solutions used to prepare the gels for which rate of gelatination curves were shown in Figure 1 are presented in Table 2. For instance, Table 2 shows that a gel containing 12.2 percent by weight of SiO_2 is composed of four volumes of concentrated silicate solution and three volumes of water. This dilute silicate solution is mixed with one volume of 5N H_2SO_4 for each volume of concentrated silicate used. The last column of this table shows the volumes of gel-forming mixtures relative to the volume of concentrated silicate needed to prepare gels containing the same concentrations of SiO_2 as given in the curves in Figure 1; i.e., 8.8 to 13.2 percent SiO_2. The volume ratios range between 4.0 and 2.5. The final volume of a gel-forming mixture containing 12.2 percent SiO_2 relative to the volume of silicate used is 2.75. This mixture was employed in the experimental well treatments discussed later.

Satisfactory Solution

Several brands of silicate of soda were used in the gel-forming tests. The specifications for silicate of soda solution which has given satisfactory results in both laboratory and experimental field treatments follow:

Specific Gravity	1.38 to 1.40
Baume Gravity	40.0° to 41.5°
Ratio (by weight)	1 Na_2O to 3.22 SiO_2
Percent Na_2O	8.9 (approx.)
Percent SiO_2	28.7 (approx.)
Percent water	62.4 (approx.)
Weight per gallon	11.6 lbs.

Sulfuric acid has been found the most satisfactory acid to employ. Either the 66-degree Baume or the 60-degree Baume acids can be used and diluted to the proper strength to give the set time desired. The strength of the dilute acid usually employed is 5N.

With respect to the studies with the urea-formaldehyde resin-forming mixtures many experiments were carried out to determine the correct proportions of chemicals to utilize in the plugging mixtures. The quantities of chemicals used in one such mixture are (1) one part by weight ammonium chloride, (2) one part by weight hexamethylenetetramine, (3) 100 parts by weight urea, and (4) 263 parts by weight of 37-percent formaldehyde solution. The amounts of ammonium chloride and hexamethylenetetramine used control the time required for the resin to solidify. With the amounts mentioned above the mixture forms a white precipitate in about 4¾ hours and a hard solid in about 48 hours at 60° F. The resin-forming mixtures were prepared by dissolving the urea together with the hexamethylenetetramine in the formaldehyde. The ammonium chloride is then dissolved in the resultant transparent solution.

Data typical of those obtained in a series of tests to determine the time required for precipitation are presented in Table 3. Similar data have been obtained for mixtures employing ammonium sulfate and hexamethylenetetramine, ammonium chloride or ammonium sulfate and melamine as mixtures of buffer salts added to control the times required for precipitation and solidification. Tests have also been made in which the mol ratio of formaldehyde to urea ranged from 1.65 to 1.0 to 2.00 to 1.0. A mixture containing these constituents in a mol ratio of 1.95 to 1.0 appeared to be most satisfactory.

Part of the laboratory studies with these compounds was to determine whether any constituent of the sand formation would prevent solidification of the resin-forming mixture. It was known that calcareous materials prevent setting of resin. The results of these tests are summarized in Table 4, and show that the sands from many oil-producing horizons from the New York-Pennsylvania area contained sufficient calcareous material to prevent setting of the resin. Unless excessive amounts are present, the calcareous material can be removed by washing the sand with dilute hydrochloric acid.

Relative Ratings

The relative ratings for degree of solidification of the resin-forming solutions in the presence of the various sands range from zero to ten. A value of zero indicates the resin-forming solution formed only a small amount of mushy precipitate above the sand while a value of ten indicates no interference; i.e., the resin set in presence of the sand cannot be distinguished from pure resin alone. A value of five is considered the minimum amount of solidification that will insure a satisfactory shutoff. It is, therefore, apparent that only in the presence of the sand from the mine at Franklin, Pa., the sand from Siggens Pool, Ill., and possibly the Clintonville sands will the resin-forming mixture set hard enough to plug the sand treated. In fact, it would be advisable to treat all these sands with acid, especially the Clintonville sand, to insure solidification of the resin.

B. Experimental Field Treatments

The results of 12 experimental well treatments are summarized in Table 5 and seven are discussed later in detail. This table shows that out of a total of nine experimental plugging jobs with silica gel, six satisfactory shutoffs were obtained, two in which packer failure occurred, and one in which there was a chemical failure. This table also contains the results of three treatments using urea-formaldehyde resin. One satisfactory shutoff was obtained, one result is not known because of physical conditions encountered in the well, and in the other a packer failure allowed bypassing. In summary, 12 experimental field tests

About the Author

DR. H. C. LAWTON, Philadelphia oil production research chemist, is associated with the Research Development Department, The Atlantic Refining Company, Philadelphia Laboratories, where he carries on studies connected with secondary recovery of oil. He was a staff member of the Pennsylvania Grade Crude Oil Association's production research laboratory at Bradford in 1945-46. Previously, he was associated with Shell Development Company and prior to joining the Shell organization he had been affiliated successively with Mellon Institute of Industrial Research and Gulf Research and Development Company, Pittsburgh.

While with Mellon Institute and Gulf he specialized in studies of petroleum emulsions and rotary drilling fluids and while at Shell he worked on various chemicals and physical means for reconditioning oil wells with particular emphasis on water shutoff methods. The University of California awarded him a bachelor's degree with major in chemistry in 1929. He obtained his master's degree in 1932 and his doctorate in 1936 from the University of Pittsburgh. He is a member of the American Chemical Society, American Association for Advancement of Science, The American Petroleum Institute and American Institute of Mining and Metallurgical Engineers.

TABLE 2

Composition and Properties of Dilute Silicate of Soda Solutions Used to Prepare Gels

SiO_2 Content of Gel-Forming Mixture Percent By Weight	Parts by Volume		Density of Dilute Silicate Solution	Volume Gel-Forming Mixture Relative to Volume "N" Silicate of Soda
	"N" Brand Silicate of Soda	Water		
13.2	2	1	1.25-1.26	2.5
12.2	4	3	1.22-1.23	2.75
11.3	1	1	1.19-1.20	3.0
8.8	1	2	1.12-1.13	4.0

NOTE: 1 volume 5 N H_2SO_4 is used for each volume "N" Brand Silicate of Soda in preparation of gel-forming mixture.

TABLE 3

Time for Precipitation and Solidification for Urea-Formaldehyde Resin-Forming Mixtures

TEST NUMBER	BUFFER SALTS ADDED PERCENT BY WT. OF UREA		TIME REQUIRED FOR PRECIPITATION		Remarks Condition After Standing 48 Hours
	NH_4Cl	Hmta*	Minutes	Hours	
1	0.0	0.0	215	3.6	Soft solid. Will not get harder.
2	0.50	1.0	..	48	Not completely solidified.
3	0.67	1.0	..	7½-10½	Soft solid. Will continue to harden.
4	0.83	1.0	360	6.0	Hard solid.
5	1.0	1.0	292	4.9	Very hard solid.
6	1.17	1.0	240	4.0	Very hard solid.

* Hmta is abbreviation for hexamethylenetetramine.
Pertinent Data: Composition of resin-forming solution:
Urea = 100 g.
Formaldehyde = 97.5 g. (216.5 ml of 40 percent solution).
Mol Ratio of Formaldehyde to Urea = 1.95:1.0.
40 ml. aliquote used in each test.
15 g. Urea in each aliquot.
Temperature = 57.5° to 62.5° F.

have been performed of which there were 7 successful, 1 indeterminate, 3 packer failures and 1 chemical failure.

Seven of these plugging jobs, six with gel and the other with resin, are discussed in detail. In two of the gel plugging treatments, Cases No. 4 and No. 5, Table 5, it was desired to plug water-bearing strata in the Bradford Third sand (81 feet open between bridge and packer) with silica gel to shut off the excessive flow of water so that a larger size dry hole could be drilled into the gas-bearing Haskell sand. It was feared that the sand would be drowned out, if drilled into with about 1800 feet of water in the hole. The first attempt to plug this formation resulted in failure because the gel-forming mixture could not be forced into the exposed sands under a surface pressure of 700 pounds per square inch. This was in all likelihood due to an alkaline condition of the sand that caused immediate setting of a thin layer of gel on the sand face. Large quantities of water immediately came into the hole upon bailing dry. In the second attempt to plug the formation the sand was washed with 3½ barrels of dilute hydrochloric acid to remove alkaline material from the sand prior to injection of the gel-forming mixture. As a result a total of 7½ barrels of gel-forming mixture was forced into the sand at a pressure of only 350 pounds per square inch. When the hole was cleaned out, no water entered and a dry hole was maintained for the duration of drilling operations. In fact, it was necessary to add water to continue drilling. The well was completed by setting a packer above the Haskell sand but below the plugged formation and the annulus between tubing and wall was filled with water. Thus, continued observation as to permanence of the gel plug cannot be made, although it fulfilled its purpose satisfactorily. The advantages gained from this treatment were (1) saving the cost of a 1700-foot string of 4⅞-inch casing; (2) drilling into the formation with 6½-inch hole instead of with a smaller hole; and (3) being able to drill into the gas sand with a dry hole thus preventing any chance of drowning the gas sand.

In Case No. 6, the gel-plugging treatment carried out on a gas injection well located near Foxburg, Butler County, Penn., is of particular interest. Prior to treatment the surrounding producing wells were produced under a vacuum. A formation between the producing and input well was so permeable that a vacuum was pulled on the input well even while injecting about 40,000 cubic feet of gas per day. After plugging, the well took only 15,462 cubic feet of gas per day under a pressure of 55 pounds per square inch. The results of this treatment are considered to be good. This well was treated during July, 1946, and the plug was still holding satisfactorily in February, 1947.

In Cases No. 7 and No. 7a, a gas well was plugged while drilling with 8¼-inch cable tools to prevent excessive flow of water into the bore hole. In Case No. 7, the upper half (mostly low permeability sand) of the bradford Third sand was sealed off. Drilling then was continued to the bottom of this sand. The lower half of the sand was more permeable and contained a water-producing stratum. The second treatment, Case No. 7a, was carried out to plug this stratum. In both cases the sand was pretreated with dilute HCl to prevent premature setting of the gel.

TABLE 4

Solidification of Urea-Formaldehyde Resin-Forming Mixture in Presence of Various Sands

Test No.	Sand	Location	Condition of Resin After Standing 72 Hrs. Relative Rating
1	None		10
2	No. 1 Limestone	New York	1
3	Bradford 3rd	Bradford, Penn.	3
4	Bradford 3rd	Mt. Jewett, Penn.	3
5	Bradford 3rd	Mt. Jewett, Penn.	3
6	Mine Core	Franklin, Penn.	10
7	Clarendon		3
8	1st Richburg	Bolivar, N. Y.	1
9	Clintonville	Clintonville, Penn.	4
10	Clintonville	Clintonville, Penn.	5
11	Berea	Ohio	3
12	Siggens Pool	Illinois	8

Pertinent Data: 50 g. indicated sand used. 40 ml. aliquots resin-forming mixture having composition given in Table 3, Test No. 5, used in each test.
Temperature = 57.5° to 62.5° F.

Results Good

Good results were achieved with these treatments. Water from the Bradford Third sand did not interfere with drilling into the Haskell sand for gas production. The gas well was tubed and the annulus then filled with water to hold the packer in place against the gas pressure. Therefore, no record of permanency is available; however, the gel plugs accomplished the desired purpose. These treatments saved the cost of a 1950-foot string of 8¼-inch casing.

Similarly, in Case No. 8, the Bradford Third sand was plugged before drilling into the gas sand. In this case the entire Bradford Third sand was plugged at one time. The results achieved in this case are similar to those described above. Again the cost of a 1900-foot string of 8¼-inch casing was saved.

The resin plugging job, Case No. 10, Table 5, was carried out on a cable tool drilling well to be completed as an oil producer in the Bradford Third sand. Excessive water flow into the hole was encountered while drilling through the Chipmunk sand. A first attempt to establish water flow into the 25-foot sand isolated between a bridge and packer prior to injection of the resin-forming mixture resulted in a packer failure. Upon removal of the packer the 2-inch anchor pipe was found to be nearly full of mud. The mud in the hole was found completely covering the formation to be treated. The hole was cleaned out, washed until free of cavings, and a new packer set. This time flow into the formation was established and the treating solution was injected without trouble. The treatment was finished by following the resin-forming solution with injection of a small amount of dilute hydrochloric acid to insure rapid setting of resin solution in the well bore and in the adjacent formation. The water previously entering through the treated sand was completely shut off.

Advantages Gained

The advantages gained from this treatment are similar to those reported for the previous job. In this case, either the cost of a 750-foot string of 6½-inch casing or the cost of handling excess water for life of well was saved.

Experience has shown that the mechanical condition of equipment used and the physical condition within the hole are as important in obtaining satisfactory shut-offs as is the application of the correct chemical plugging mixture.

These treatments together with the

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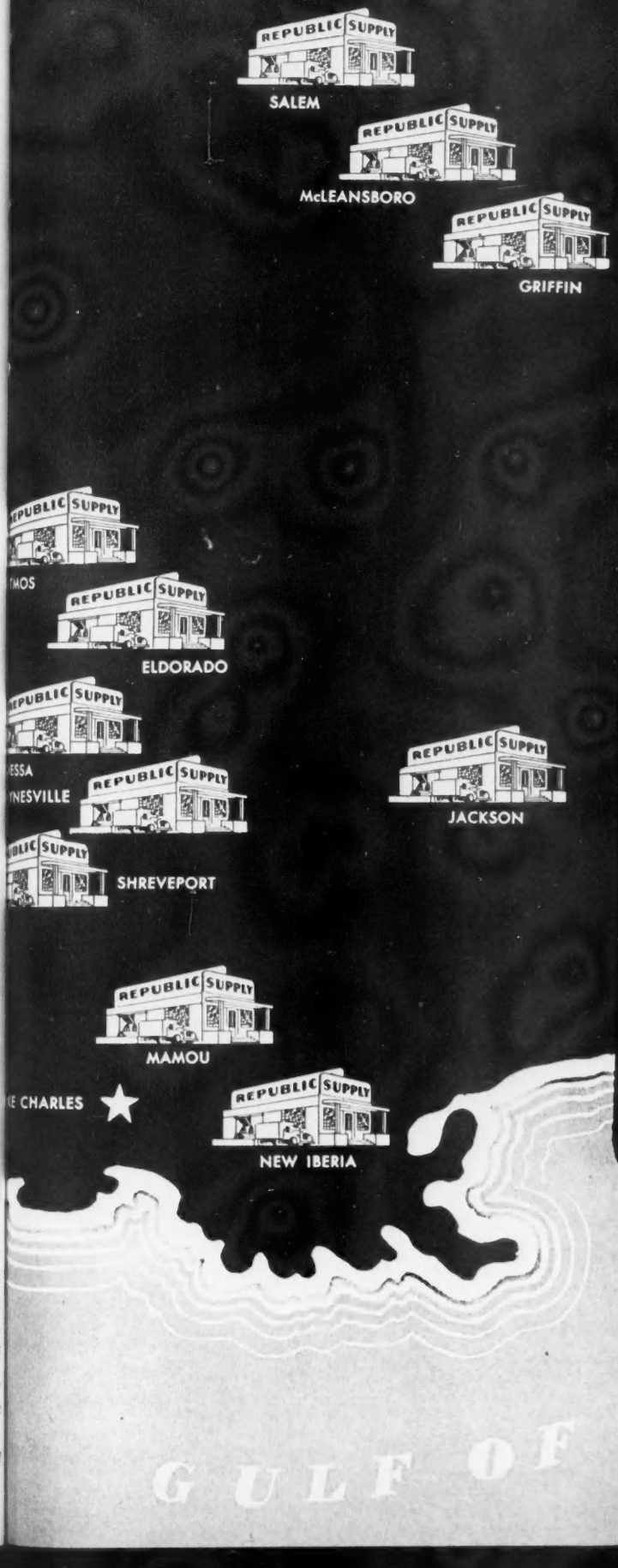

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TABLE 5

Summary of Experimental Well Treatments

Case Number	Type of Well	Location	Sand Treated	Thickness Sand Treated, Ft.	Treating Solution	Volume Solution Injected Bbls.	Results Obtained	Remarks
1	Water Input	Bradford	Bradford 3rd	12	Silica Gel	5.9	Good Shutoff	After 1 year pumping plug still appears to be holding.
2	Water Input	Bradford	Bradford 3rd	12	Silica Gel	4.5	Failure	Packer failure—Treating solution by passed packer and remainded in bore hole. Packer was set on 1½" pipe.
3	Oil	Clintonville	1st sand	111	Silica Gel	6.0	Failure	Reconditioning at old well—Surface of well bore undoubtedly contaminated with mixture of oil and wax. Could only force about ½ bbl. of solution into formation before packer failed. Held about 3 weeks during reconditioning and drilling operations before water entered hole.
4	Gas	Mt. Jewett	Bradford 3rd	81	Silica Gel	14.6	Failure	Chemical failure in all likelihood due to alkaline condition of formation. Could not force gel-forming solution into formation under 700 psi surface pressure. Upon bailing bore hole dry, water immediately started to enter hole.
5	Gas	Mt. Jewett	Bradford 3rd	81	Silica Gel	7.9	Complete Shutoff	Formation acidized with 3.6 bbls. of dilute hydrochloric acid solution to remove calcareous material from formation adjacent bore hole.
6	Gas Input	Foxburg	2nd Venango	12	Silica Gel	11	Good	Formation pretreated with 8 bbls. of dilute HCl followed by 6-7 bbls. of water.
7	Gas	Mt. Jewett	Bradford 3rd	26	Silica Gel	3	Good	Treated upper part sand only. Formation pretreated with 8 bbls. of dilute HCl followed by 6 bbls. of water.
7A	Gas	Mt. Jewett	Bradford 3rd	43	Silica Gel	5.5	Good	Water sand making 18 bbls./day. Pretreated with 10 bbls. of dilute HCl followed by 6 bbls./day. Silica injected under surface pressure of 600 psi.
8	Gas	Mt. Jewett	Bradford 3rd	82	Silica Gel	9	Good	Pretreated by gravitating in 20 bbls. dilute HCl followed by 6 bbls. of water. Water sand from 1827′ to 1832′ (5 ft.)—Prior to plugging well made 48 bbls. water per day—Following treatment well made 4½ bbls. water in 3¾ days.
9	Water Input	Bradford	Bradford 3rd	15	U-F Resin	6.5	Indeterminate	Well not given thorough test. On basis 1 hour test shutoff 65-70 percent obtained. Water entered hole again while drilling next 18 inches—Water may have come from new hole.
10	Oil	Clintonville	1st Sand	120	U-F Resin	9.5	Failure	Treating fluid bypassed packer under 350 psi surface pressure. Solid resin found in hole upon cleaning out.
11	Oil	Bradford	Bradford 3rd	24	U-F Resin	4.4	Complete Shutoff	Plug is still holding after 9 months.

others carried out show the widely differing types of conditions under which plugging treatments with silica gel and resin can be applied. There appears to be no reason why such jobs cannot be carried out successfully on water input, oil, and gas wells under circumstances similar to those described above. Such treatments can be employed to control excessive flows of water into drilling wells, to seal off thief sands in both water and gas input wells, and to control water-oil and oil-gas ratios in producing wells.

Summary

Several advantages are to be gained from selective plugging of sands in secondary recovery operations. Among these advantages are, (1) decreased bypassing of water and gas through thief sands; (2) lowered pumping costs, both input and production; (3) increased input into the less permeable sands with resultant increased rate of oil recovery; (4) saving costs of long strings of casing in cable tool drilling wells; (5) the advantages gained from larger holes drilled into production or input horizons; and (6) the advantage gained from preventing drowning of gas wells during drilling operations by water entering hole from stray water sands.

The preparation, properties and composition of applicable silica gel-forming solutions and urea-formaldehyde resin-forming solutions have been presented.

Experience gained in carrying out the plugging treatments has conclusively shown the importance of having equipment in good mechanical condition and of having the hole in the best possible physical condition.

Results to date indicate that chemical plugging agents can be used in water, oil, and gas wells to control excessive flows of water into cable-tool drilling wells, to seal off thief sands in both water and gas input wells and to control water-oil and oil-gas ratios in producing wells.

Acknowledgments

The author wishes to thank Dr. Richard V. Hughes, director of research of Pennsylvania Grade Crude Oil Association's Production Research Laboratory at Bradford, Penn., for permission to publish most of the data reported herein. The author acknowledges the cooperation of the Quaker State Oil Refining Corporation, especially Kenneth Barton of their staff for his assistance and many suggestions while carrying out several field treatments, and of the Whitehead Oil Company. The author also wishes to thank the South Penn Oil Company for permission to include data for several well treatments and to their Dr. Kurt Andresen for his help in carrying out these treatments.

COMING SOON

Coring the Burgess Sandstone

By CARL A. MOORE
Associate Professor
University of Oklahoma

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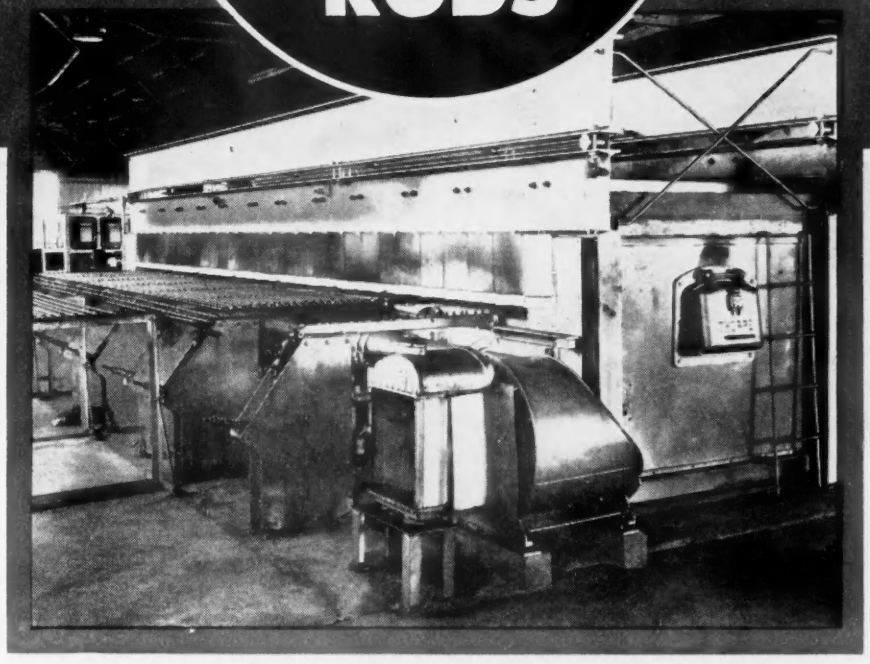

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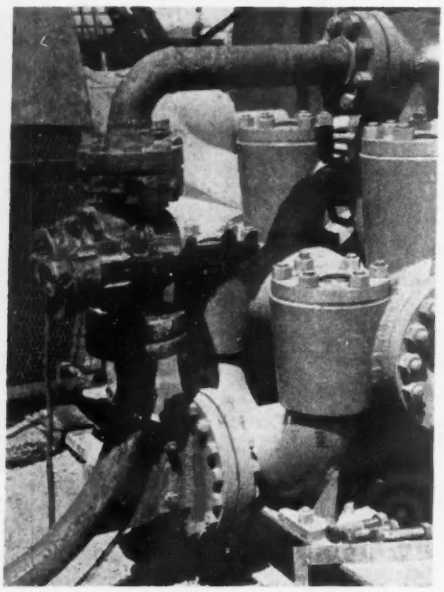
DRILLING HINTS

Anchor Mud Discharge Line to Suction Flange



MUD LINES

In order to reduce excessive vibration that might rupture or damage high pressure mud lines and fittings at the point where they connect into the mud pump, one company installs the high pressure discharge lines in such a way as to permit anchoring them to the body of the pump as illustrated. In this instance, the high pressure line was brought out horizontally a short distance, then downward near ground level where it was sloped off to the horizontal. A fillet of steel plate, welded to the back side of the bend, was attached to a clip welded in turn to the face of a blind flange on the lower portion of the pump body.

Bolted together as shown, the connection may be removed quickly when equipment is being moved to another location. It provides rigidity at the point where vibration would be excessive, and the small amount of work entailed in its installation is far outweighed by the improvement and security provided by this type of assembly.

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Support Mud Suction Hose

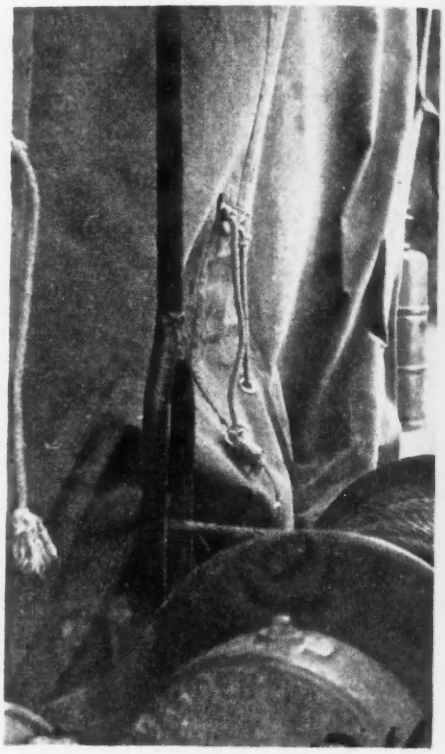
SUCTION LINES

Support of the mud suction line and subsequent adjusting of the intake depth in the settling ditch frequently involves much blocking and rigging up of overly-complicated winching devices. A Canadian drilling contractor has eliminated much of this problem by the fabrication of a simple modified A-frame device made of salvaged pipe materials and on which is mounted an equally simple hand-operated winch.

The ingenious truss-like support, illustrated, utilizes as an anchor, the weight of the mud pump itself. Spread apart at the pump end so as to permit hooking into the skid base of the pump unit, the two arms of the structure come out horizontally for nearly half of its length, then arches upward at a nearly 45-degree angle, to come to a point some four or five feet above ground level. Hung at this apex is a light block over which is passed the winching wire line supporting the intake pipe.

Minor adjustments in the height of the block may be made merely by placing a block on the ground beneath the "knee" of the pipe support.

Aid Winch Spooling



WIRE LINE HANDLING

Where long winch lines are used, it is necessary to spool them properly to prevent the line from piling up and wedging so that it is difficult to unspool. One company, to save the swampers time in continually climbing up on the truck bed, made a spooling device as shown. Hinged at the bottom and provided with an eye on the top for easy handling, it consists of an opening with three-fourths inch bar on either side to allow passage of the wire line. Whenever the winch line is reeled in, the driver thrusts his arm through the window and guides the line into the proper groove.

Where tarpaulins are used to protect the men, this device also prevents the tarp bottom from becoming fouled in the winch.

This rig was converted from steam to power . . .
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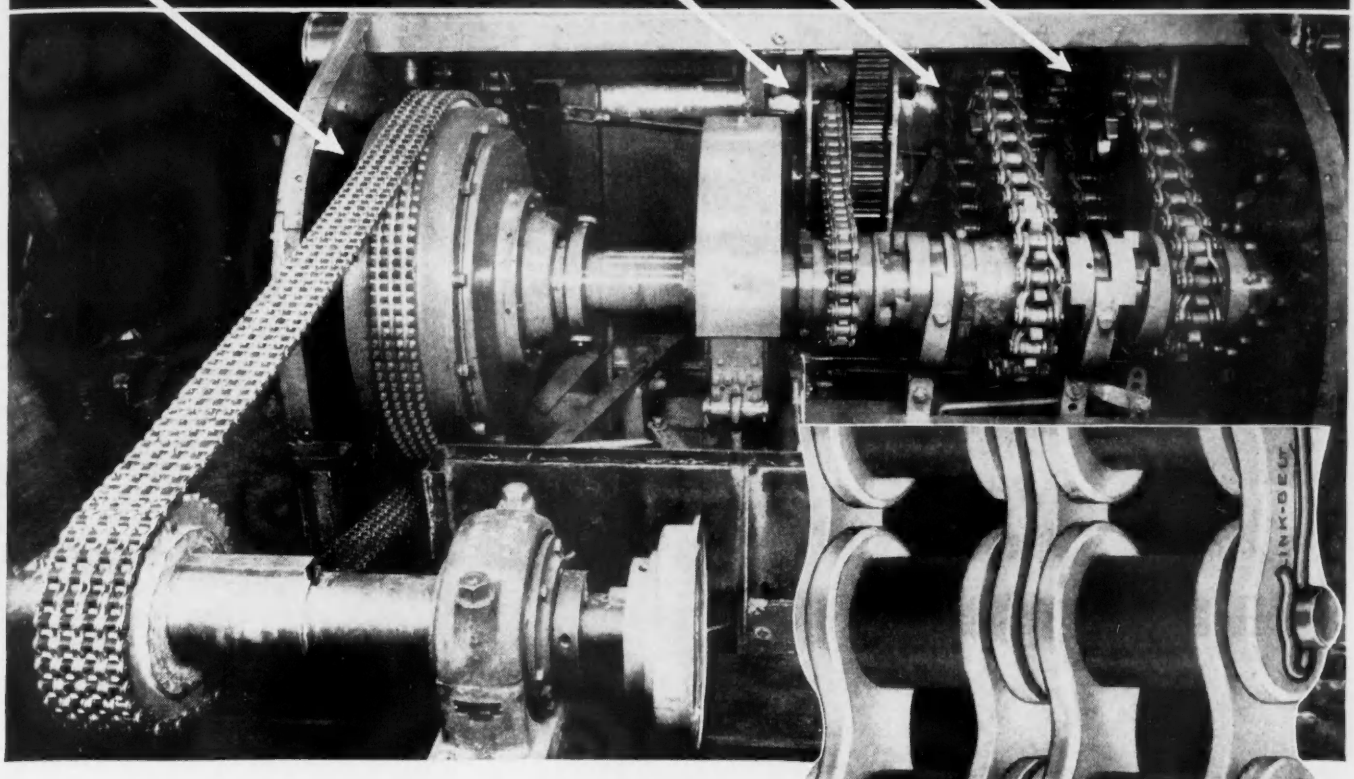

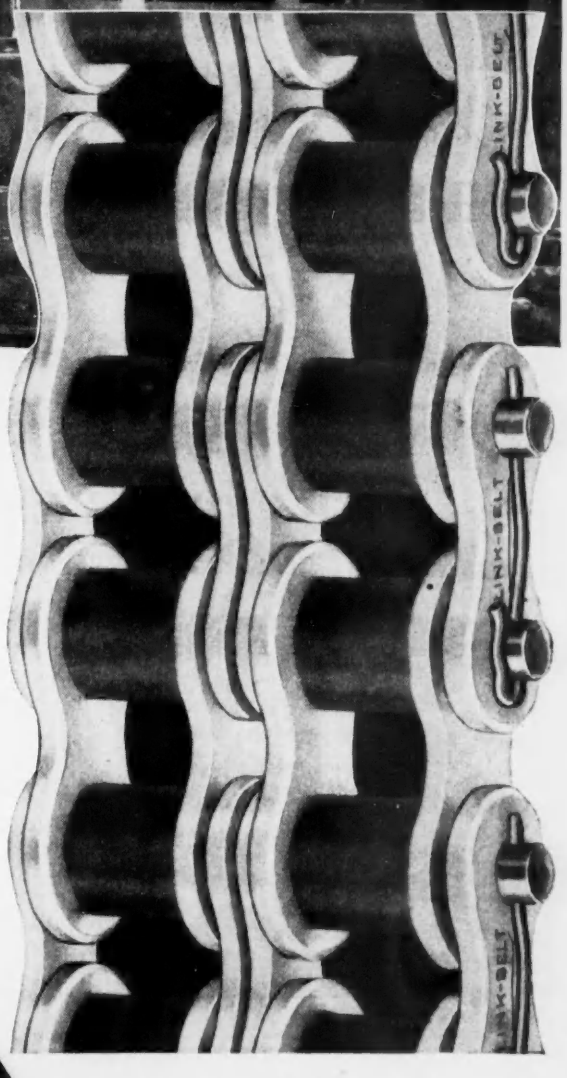

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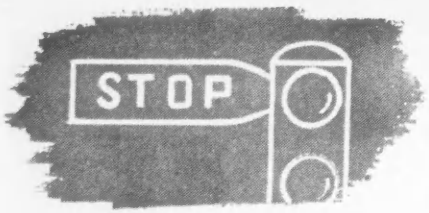

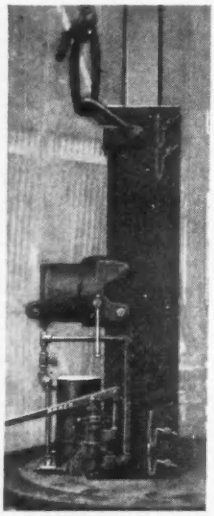

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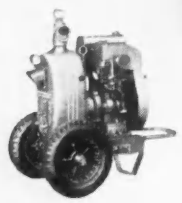

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Effective with the publication of this issue, The OIL WEEKLY will increase its payment for acceptable, illustrated, practical ideas pertaining to drilling, production and pipe line operations from the former $5 per hint to $10 per hint.

Use Removable Ramps to Add Turn-Around Space

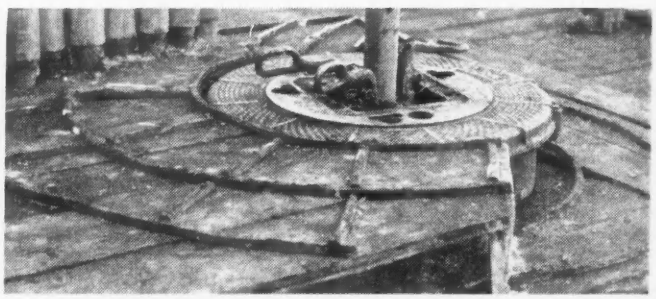
RAMPS

The use of long, low ramps to facilitate hauling of the drawworks and other heavy equipment up to the derrick floor level, frequently means the sacrificing of considerable yard space due to the long ramps projecting out into the turn-around area. One operator eliminates part of this difficulty by making removable the last five or six feet of the ramp. Illustrated, the removable ends are provided with hooking clips made of steel plate and which are dropped over horizontal bolts run through the heavy timbers of the principal sections. Locked into position, the ends of the ramp abut solidly against the main sections and can be removed only by lifting straight up.

Heavy steel rings, embedded in the surface of the ramp-end sections, simplify their being hoisted in or out of their locking position.

Make Derrick Floors Skid Proof with Old V-Belting

SAFE PRACTICES

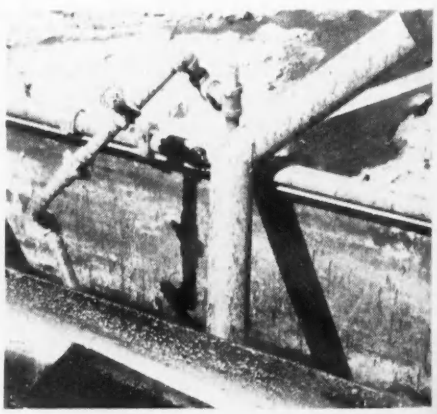


In order to reduce the possibility of men slipping while working around the rotary table, and particularly while coming out of the hole with a string of pipe, one company makes good use of salvaged V-belting. This material is laid out in concentric circles around the table, as illustrated, with short radius strips being laid out between them. The belting is laid with the top, or wide side down, and is held in place by nailing to the plank floor. Low enough to present no obstacle for normal walking, the non-skid material nevertheless provides something against which the roughneck can brace himself while handling drill pipe or slips.

The belting can be cut up and laid down in a few minutes, and when tearing down, requires even less time to remove. If taken up carefully, the strips can be re-used at succeeding locations.

Fabricate Mud Jet System

MUD HANDLING



An easily-manipulated device for emptying a mud tank, and particularly for the removal of heavy sludge or settlings that have accumulated at the bottom of the tank, is contained in the device utilized by one drilling company. A small line taken off the high pressure mud gun line running along the edge of the tank, extends down to a jet in the lower end of a section of 4-inch pipe, the latter provided with a gooseneck to facilitate emptying the material over the side of the tank. Turning in the high-pressure mud causes material in the tank to be jetted out over the side. The unit can be moved to a limited degree about the bottom of the tank, since the high pressure line is provided with two swings which give it flexibility.

The installation is inexpensive to install, and by providing several outlets along the high-pressure line, the unit may be picked up and installed in any portion of the tank system.

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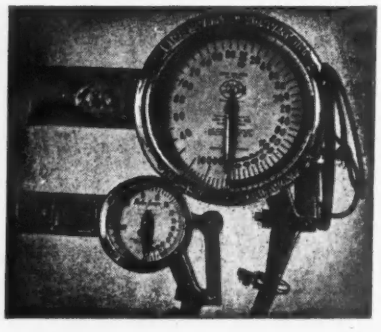

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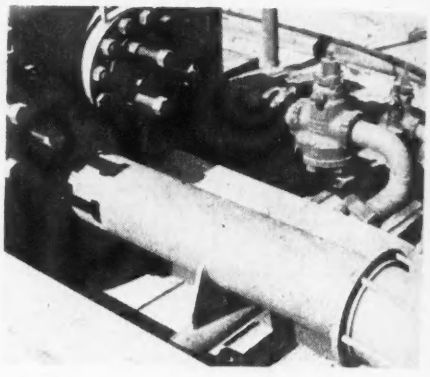
Relieve Suction Flange of Pump Vibrations

SUCTION LINES

To relieve the flange joint at the suction chamber of the mud pump of vibration and consequent strain, one contractor utilizes the extra heavy three-inch priming line as auxiliary support. The priming line crosses through the pump skid some three feet from the face of the pump, and lies some four inches below the nearest point in the suction.



A saddle of heavy boiler plate, cut to fit the circumference of the suction, is welded to the priming line and the flange bolts then pulled up as tightly as possible. After the pump has been operated a few days the flange bolts are gone over again and all slack taken. A light bead is then run between suction nipple and saddle, tying the two together rigidly.

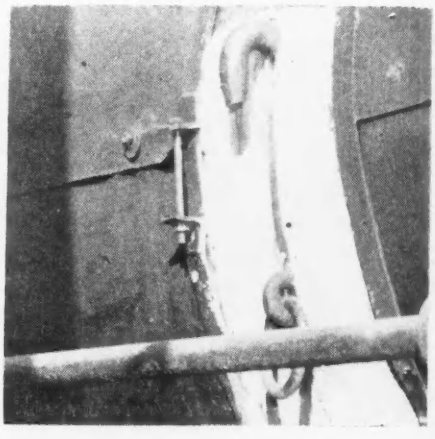
All vibration of the extended pipe is thus snubbed, and the gasket relieved of twisting and cramping which, with a free suction, might result in air leaks and consequent drop in pump efficiency.

If, for any reason, the suction nipple must be removed, the bead on either priming line or suction nipple is burned off, and replaced after repairs have been completed.

Speed Boiler Handling

BOILER CARE

Hooks, eyes and similar attachments welded to the side and lower portions of the boiler shell greatly speed up and ease the handling of boilers when the latter are being positioned at the drilling site. The hook, shown on the side of the unit, has a shank some 12 inches long, which provides ample welding area and consequent strength where it is attached to the boiler shell. The hooks, accurately located so the unit will be balanced when picked up by the crane, provide a quick, dependable means of attaching slings. In addition, a minimum of damage is done to insulation and fittings during the loading and unloading operations.

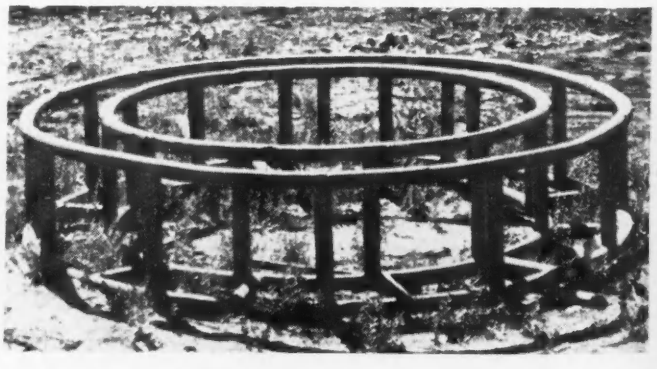


Pull lines, quickly looped through other hooks or rings provided at strategic points, permit the ground men to quickly position the unit as it is swung over by the crane.

Protect Rotary Hose During Rig Moves

EQUIPMENT HANDLING

Few pieces of rotary equipment will reflect careful handling while off the rig, than will the rotary hose. Because of its weight and awkwardly handled bulk, the hose frequently is subjected to kinking or undue abrasion. If cared for in the manner adopted by one operator, however, its life can be prolonged considerably. A large reel, made of 2-inch pipe and welded together in the form illustrated, provides a simple, economical means of handling the hose.



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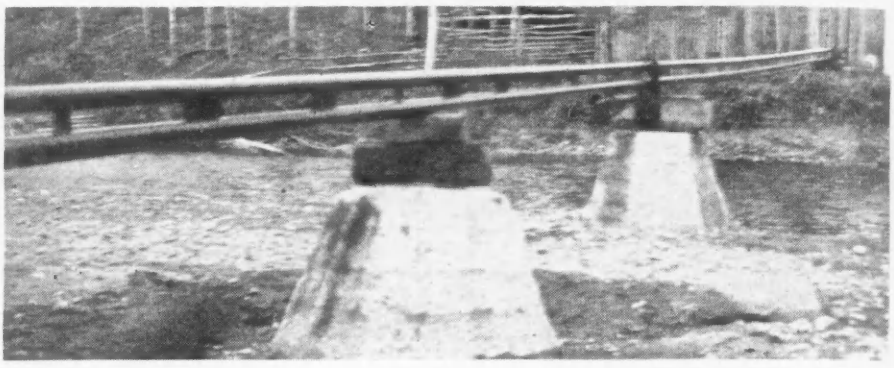
Span Stream with Double Line and Few Supports



STREAM CROSSINGS

A convenient, inexpensive method of spanning a shallow creek bed with oil or water lead lines is contained in the ingenious method employed by one oil company. In a situation where a single large line would have required expensive supports or suspensions, use was made of two smaller, parallel lines, one lying above the other, and which are spaced and joined as a single unit by welding short sections of steel plate between them at regular intervals as illustrated. Welded together in this fashion, the two lines in effect form a truss which is more self-supporting than would be a single line. Admitting that such a method consumes more pipe, due to friction losses in the smaller lines, it was cheaper, nevertheless, in this instance, for there was more of the smaller size pipe available. In addition, time and cost factors ruled against the installation of a support or suspension bridge system. The present double line easily spans the creek with only two piers in the center of the creek bed serving as supports.

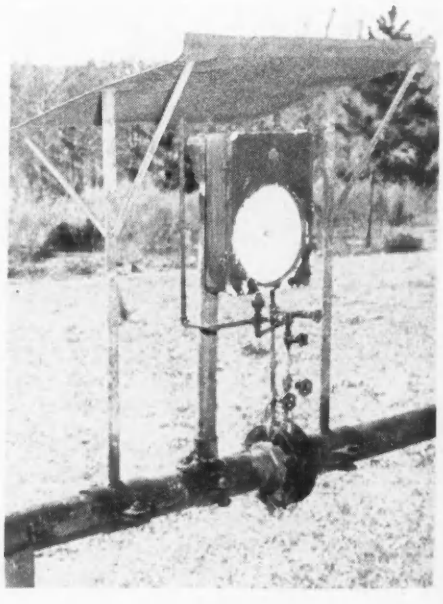
Protect Recording Gauges with Simple Shelter

EQUIPMENT CARE

To protect the recording gauge on a meter run from sun and rain, and at the same time leave it readily accessible, one company clamps a unique shelter unit on the line around the orifice fitting. The shelter is made of a four-foot square of tank plate, with one edge turned up to form a two-inch curved surface. This plate is supported on a pair of uprights, each carrying braces at 45 degrees to support the edges of the plate.

The uprights terminate in saddles formed to fit around the pipe of the meter run with matching clamps to permit rigid attachment where desired. When the uprights are not set perpendicularly to the roof plate, but at a slight angle, so that the "roof" thus formed tends to carry water away from the turned-up edge. This edge serves to prevent rain falling on the shelter from being blown across the plate and off the edge at a point where it can fall onto the metering unit.

Being open on all sides, the shelter offers no trap for gases, and does not interfere with chart changing or regulation of the meter. On the other hand, it does keep all but early morning or late evening rays of the sun from the recording unit, and thus improves its operating conditions and makes for more accurate records.

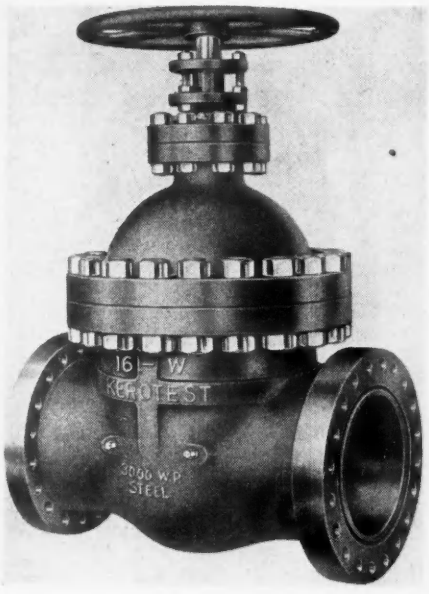


NEW EQUIPMENT LITERATURE

FOR ADDITIONAL INFORMATION, USE MAILING CARD INSERTED OPPOSITE THIS PAGE

1—Drilling Valve

A completely pressure-lubricated drilling valve incorporates many outstanding features for this type valve. The manufacturer states that all drilling valve production will have this feature



which has been adopted after extensive field testing.

Current drilling valve production provides for high-pressure lubrication of the wedge seats and the stuffing box. The specially constructed Alemite lubrication fittings have been located on the valve body and stuffing box to prevent damage during handling on the derrick floor or in transit.

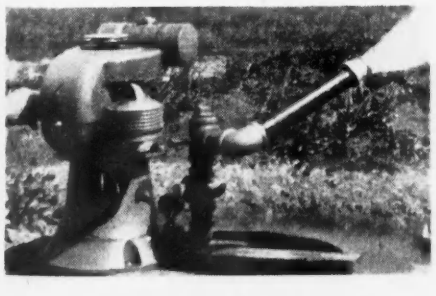
Special construction of the lubricator fittings permits them to take the lubricating gun directly. An internal and an external seal prevents leakage or blowouts under high pressures. Stuffing box lubrication reduces wear on the stem, eases operation and gives additional lubrication to the packing.

Kerotest Manufacturing Company, 2525 Liberty Ave., Pittsburgh.

(Check item 1 on postcard for more information.)

2—Pump

A new-type gasoline engine driven pump is particularly suitable for pressure water supply where electric power



is not available or cannot be quickly or conveniently connected at the desired spot. Oil field applications include supply pump and a general utility pump for washing down, etc. Its compact design and light weight are claimed to make this unit adaptable to portable rigs where space is limited.

The pump has only one moving part, a cast bronze impeller with a stainless steel shaft which is directly coupled to the engine crankshaft. The engine is a two-cycle type using all anti-friction bearings, high-pressure aluminum die cast alloy, and is said to be the result of extensive wartime development. The engine is equipped with a patented scavenging system and a built-in high-tension magneto which utilizes Alnico "V" permanent magnet material in the magneto rotor to provide easy starting.

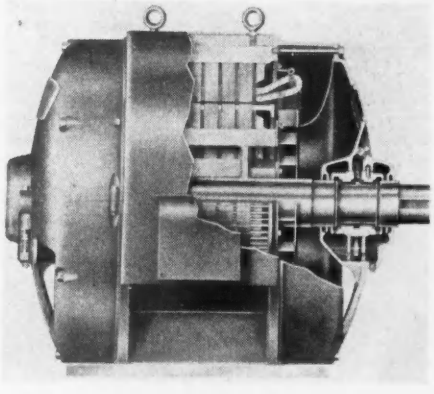
Depco pumps are available in sizes up to 2000 gallons per hour capacity for deep well service; up to 3000 gallons per hour for shallow well service; and up to 4000 gallons per hour for conditions requiring larger volumes at lower pressures.

Diesel Pump & Electric Mfg. Company, 110 West Broadway, Glendale, Calif.

(Check item 2 on postcard for more information.)

3—Induction Motor

Heavy-duty squirrel-cage induction motors for large-power drives from 100 to 1000 horsepower at 1800 revolutions per minute and lower speeds, answer industry's demand for motors designed



for drip- and splash-proof construction. Fabricated steel frame shuts out falling particles, makes operation quieter and invites easy cleaning. Inspection and blowing out is simplified on larger ratings with access plates designed for speedy removal and replacement.

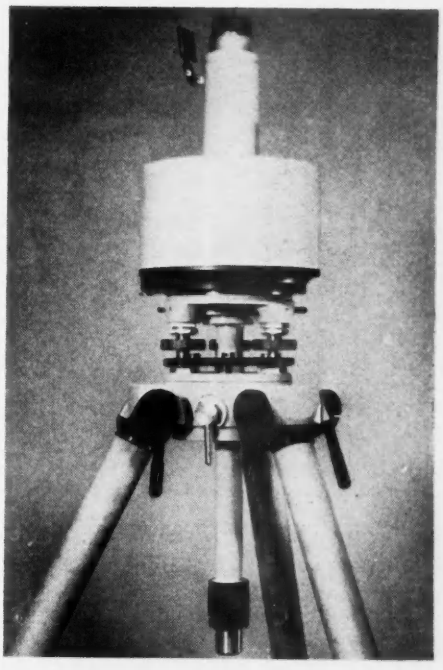
Sealed bearings can be cleaned and refilled without motor disassembly. Double-end ventilation is provided by a blower on each end of the rotor. Starting characteristics are NEMA Class B (normal torque, low starting current), for across-the-line starting.

Electric Machinery Manufacturing Company, Minneapolis 13.

(Check item 3 on postcard for more information.)

4—Magnetometer

A new magnetometer designed for scouting or reconnaissance work employs lightweight, ruggedness, and ease of adjustment in the field. By careful designing and selection of materials,



total weight of the tripod, compass and complete instrument was reduced to approximately 12½ pounds. The scale is of the direct-reading type, with equal divisions from zero to 100. Sensitivity of the new instrument is said to be 20 gammas per scale division using a modified Askania-type temperature compensating system.

Other features include a new-type hold-down plate, a 180-degree stop in the instrument base, large leveling screws, automatic lock on the system release lever, collet-type lock for compensating magnet tube, automatic releasing and locking compass needle, tubular, non-adjusting tripod legs, and a pivot arrangement for releasing the system.

The thermometer and leveling bulbs are read from the top of the insulated case. By changing the optical system of the instrument, the sensitivity may be increased to ten gammas per scale division. It also can be equipped with the adjustable Askania-type tripod legs. The magnetometer is completely equipped with compensating magnets, tools, and carrying case for both tripod and instrument.

The Robertson Company, 5022 Ennis St., Houston 4.

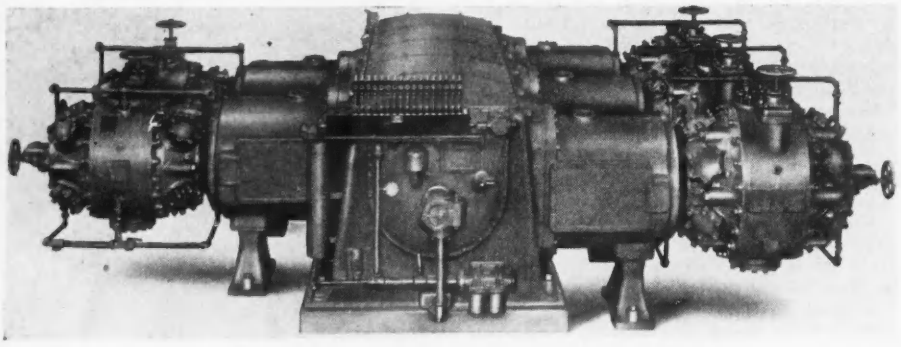
(Check item 4 on postcard for more information.)

5—Motor-Driven Compressor

A motor-driven compressor of entirely new design and offering space-saving possibilities has been designated the Type JM. It is available in six sizes

with a great variety of compressor cylinders to provide a wide range of volumes and pressures for handling air or gas. It is built with from one to six crank throws and ranges in horsepower from 500 to 2750. The compressor stroke is 14 inches and it operates at a speed of 300 revolutions per minute. Power for driving it can be taken from a standard synchronous electric motor, an engine, or a turbine. All cast parts are of Meehanite metal.

The one-piece box-like frame is open at the top for admitting the crankshaft and is locked by steel tiebolts and covered by aluminum plates. A sump-type base holds the entire lubricating oil supply. The lubricating system, which includes a pressure pump and a builtin filter and cooler, furnishes oil under pressure to all moving parts.



The "JM" has a 10½-inch diameter counterweighted crankshaft, which is supported in babbitt-lined bearings. Both main and connecting rod bearings permit interchangeability and replacement without scraping or machining. Connecting rod bearing caps are fastened to the rods by four high-strength steel bolts to prevent bearing distortion and each connecting rod has specially designed ribs for added strength.

Crosshead guides, one for each crankthrow, are mounted on the sides of the frame in an alternating arrangement, making the compressor cylinders accessible. The crossheads are adjustable and have babbitt-faced shoes.

The compressor cylinders for the new unit are the same as those used on Type GMV and are interchangeable. Provision can be made for low vacuums or for high pressures, as well as for all intermediate pressures.

The cylinder valves are of a standard ring-plate type and are self-cleaning. Valve seats are renewable, and interchangeable from suction to discharge.

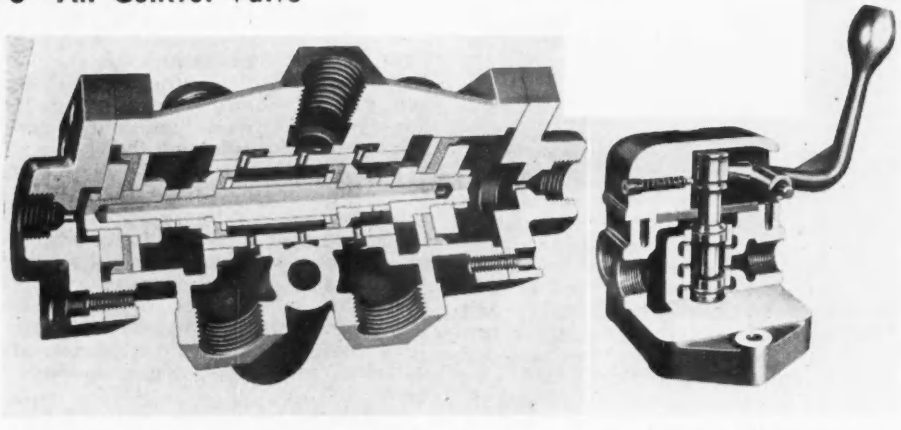
Electrical or mechanical unloading by means of compressor suction valve lifters is also available, offering automatic control of flow or pressure. Automatic starting can be provided and compressor cylinders can be automatically unloaded for easy starting. Bearing temperature shutdown, low lubricating oil pressure shutdown, and various other controls are available, depending upon the type of installation.

Dimensions of the Type JM compressor range from 11 feet, 7 inches to 24 feet, 6 inches in length, and from 13 feet, 9 inches to 24 feet, 2½ inches in width. Lengths may vary slightly, depending on the size motor used, while the widths may vary according to the type of compressor cylinder.

The Cooper-Bessemer Corporation, Mount Vernon, Ohio.

(Check item 5 on postcard for more information.)

6—Air Control Valve



Completely redesigned and now available in 79 standard models, this improved line of air control valves embodies advanced sliding piston-type construction. Four-way air valves are now offered in the following wide range of control types: (1) direct operated and (2) remote operated.

Manual operation is available in the two and three-position types, with ball detent or spring return to top, bottom or neutral. Three-position valves have cylinder ports exhausting or blocked in neutral. The toggle control type is designed for trip dog, cam or manual operation. The foot control air valve provides both latching control (indefinite dwell), and direct operation for treadle. Cam control types are made with a cam roller for operation by rotary or straight line motion cams. Light duty types are highly compact, with ¼-inch port four-way valves operated by finger-type or palm-type push button, toggle, cam or builtin air cylinders. Remote types include electric, bleeder and pilot pressure operated valves.

Balanced construction produces equal pressure on both sides of the piston. The pistons are light in weight, permitting high speed operation and rapid reversals, particularly in the electric operated models. Rapid response also results from the full pipe size of ports and internal air passages, permitting unrestricted air flow. Valve seats and rod packing are eliminated in the new design. Long sealing life is obtained through the self-cleaning construction, which wipes piston walls clean of abrasive particles with every piston movement. Durable synthetic rubber cup packings assure positive action without leakage. All valves in the new line are designed for operation at 150 pounds per square inch pressure.

Logansport Machine Company, Inc., 905 Center Ave., Logansport, Ind.

(Check item 6 on postcard for more information.)

7—Corrosion Preventive

A new class of reagents for the prevention of corrosion in oil and gas well equipment has been developed. Called "Kontol Corrosion Preventives," these inhibitors have been shown by laboratory and field tests to be effective in materially reducing corrosion in both pumping and high-pressure condensate wells.

Recent experience indicates that with wells produced at pressures above 1500 pounds per square inch and at reservoir temperatures above 160° F., corrosion may be serious if more than 0.2 percent of CO_2 by volume is present.

Kontol 115 is said to be a non-toxic, oil soluble, nearly odorless liquid which readily lends itself to well treatment. Manufacturers claim there is no tendency toward plugging of the formation or well tubing by its use, since Kontol 115 does not show any reaction with salts carried by the brine, nor does it raise the pH of the brine with the possible resultant deposition of calcium or magnesium scale. Although oil soluble, Kontol 115 is surface active and builds up a thin film on the metal surface which protects the metal from corrosive elements in either the brine or condensate. Since it is a concentrated inhibitor, only small volumes are said to be required to maintain this film.

Tretolite Company, Webster Grove, St. Louis 19.

(Check item 7 on postcard for more information.)

8—Super-Duty Truck

A super-duty six-wheeler has been developed for far-western states operations. Model LTSW, in truck or tractor types, for express highway duty, is said to be capable of handling huge loads either alone or in various combinations with semi-trailers or full trailers. Model

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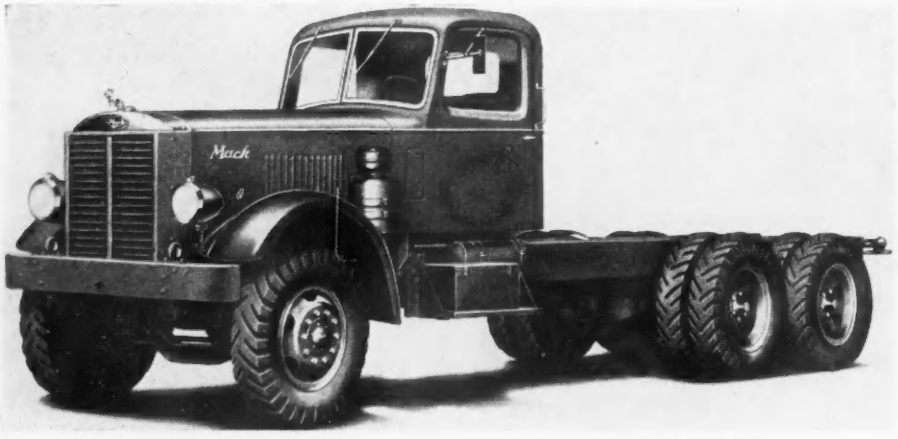
MOLY

LTSW-L is modified to meet the most strenuous demands of off-the-road duty.

Standard power source is the Mack EN 707A engine, latest of the famous Thermodyne series, which develops 196-brake horsepower at conservative speeds. For exceptional conditions requiring abnormal power output or the use of butane fuel, the Hall-Scott Model 400, developing 290 horsepower with gasoline or 306 horsepower with butane, are available.

The transmission affords ten useful speeds. Where extremely difficult operations require a wider than average ratio



range, a separate, mid-ship mounted auxiliary transmission is offered in conjunction with the over-geared, five-speed main transmission.

The heavy-duty, balanced bogie brings new advantages to the six-wheeler field. Self-steering and full tracking provide stability at all times, regardless of road irregularity or unbalanced load conditions. Maintenance requirements have been reduced to a minimum. Only two trunion bearings require lubrication. Springs, mounted in rubber, require no lubrication, and no part of the suspension ever needs adjustment, the makers claim.

A power divider serves as a third or inter-axle, differential. Dividing the power between the two axles of the bogie, it is said to avoid concentration of torque on one axle, and eliminates backlash and wheel slippage. Massive dual reduction axles employ the Mack tetrapoid spur gear design for reduction and orthopoid bevel pinion gears for change of direction.

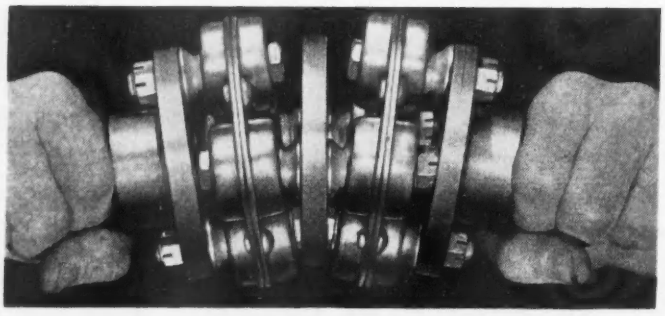
Two entirely independent brake systems provide unfailing reliability. Large brake block area and air chambers achieve fast, positive and simultaneous braking on all wheels.

The husky pressed channel frame is graced by two box-girder cross members, three channel cross members, and one fabricated I-beam. The cab is designed for three-man comfort, styled to moderate streamlined appearance. Features include: fully adjustable individual driver's seat, large, full-vision windshield, indirect lighting on instrument panel and cowl ventilators.

Mack Trucks, Inc., Empire State Building, New York City.

(Check item 8 on postcard for more information.)

9—Flexible Coupling



The double Morflex coupling (a universal-joint type), now in full production, obtains torsional resilience through the preloaded Neoprene biscuit construction. Since the double Morflex is, in effect, two single Morflex couplings with a center plate adapter, the new model has twice the torsional resilience (softness) of the single coupling, the manufacturers state.

Acting as a universal drive connection, the double coupling accommodates offset and angular misalignment of shafts. The double coupling also permits constant velocity between driving and driven member. With no metal-to-metal contact, the new model coupling requires no lubrication, is said to be noiseless and void of vibration, reduces bearing wear, and is dielectric. The coupling is available in ten sizes, in capacities from 13 to 725 foot-pounds of torque.

Morse Chain Company, Detroit 8.

(Check item 9 on postcard for more information.)

10—Selective Plugging Agent

A new chemical, Dresinol, a selective plugging agent, is said to substantially reduce the cost of secondary recovery of crude oil by water flooding and at the same time increase the output of oil. In application, it is pumped down an ordinary intake well, after which the flow of water into the well is reduced at the well head.

Because there is less resistance to pressure in the loosely packed sands, the Dresinol solution, a resin emulsion, is said to flow into these layers. In a matter of hours; these layers become almost impervious to the penetration of water. The amount of water and water pressure introduced in the intake well is then increased and the water, seeking the path of least resistance, bypasses the sealed strata of sand and is forced into the strata of sand which were previously unaffected.

Dresinol already has been proven successful in extensive field tests in the Bradford, Penn., oil fields. On one lease, the daily saving of water for each input well was reported to be three barrels for each gallon of plugging agent.

Hercules Powder Company, Wilmington, Del.

(Check item 10 on postcard for more information.)

Literature

11—Road Weight Restrictions

A comprehensive study of the road laws regulating trucks and trailers throughout the U. S., entitled "1947 Truck & Trailer Size & Weight Restrictions" 18th edition, has been completed by the Research Department of The Four Wheel Drive Auto Company. Extreme diligence was exercised in compiling this booklet to eliminate errors by securing the cooperation of the officials in each state. These officials have checked the laws of their respective states and the compilation is believed to be correct. Changes may be made in the interpretation of the laws by rulings of the courts or changes made through legislation. Because such changes may have been made, the compilation of the 1947 guide may be subject to corrections in some cases.

Advertising Department, The Four Wheel Drive Auto Company, Clintonville, Wis.

(Check item 11 on postcard for more information.)

12—Neoprene Hose

"The Effect of Fuels Containing Aromatic Hydrocarbons on Neoprene Hose" is the title of an eight-page booklet describing the tests made on Neoprene rubber hose subjected to aromatic hydrocarbons such as toluene.

Background of the tests as well as the equipment involved are fully discussed to give the reader full benefit of the significance of these experiments. Photographs and shaded drawings illustrate the manner in which the hose was tested. Graphs, charts and tables give details of the results, which include comparisons of various types of hose. Composition data on all hose tested are listed.

Public Relations Department, E. I. du Pont de Nemours & Company, Inc., Wilmington 98, Del.

(Check item 12 on postcard for more information.)

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For the kind of equipment that serves the interest of an industry—not merely supplies it—turn to Dresser Industries, Inc., Terminal Tower, Cleveland 13, Ohio.

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Beaumont, Texas; Torrance, Calif.

KOBE, Inc.,
Huntington Park, Calif.

PACIFIC Pumps, Inc., Huntington Park, Calif.

PAYNE Furnace Co., Beverly Hills, Calif.

ROOTS-CONNERSVILLE Blower Corp.
Connersville, Ind.

SECURITY Engineering Co., Inc.
Whittier, Calif.

STACEY BROS. Gas Construction Company
Cincinnati, Ohio
Stacey-Dresser Engineering Division
Cleveland, Ohio

Patent Roundup

A Regular Feature of
THE OIL WEEKLY

Patents issued by the United States Patent Office, Washington, D. C., include those listed below.

Printed copies of the patents listed are furnished by the Patent Office for 25 cents per copy and can be had by addressing the Commissioner of Patents, Washington 25, D. C.

Flexible Pipe Section and Coupling

This patent (No. 2,402,003), owned by John A. Zublin, is unassigned.

The flexible pipe section comprises a resilient metal tube slotted between its ends to provide flexibility and having an unperforated flexible lining bridging the slots. Interlocking elements extend through the lining and tube over an area adequate to create an hermetic seal near each end of the tube.

Valve

Alfred C. Arbogast, Elkhart, Ind., holds this patent (No. 2,418,447) which he has assigned to Northern Indiana Brass Company.

There is a tubular outer body having a tubular lateral extension in which is disposed concentrically a tubular inner body that projects from it and extends into the outer body transversely. The inner body has oppositely disposed fluid openings axially spaced, each opening to an end of outer body member, the sides of the inner body between its fluid openings being brazed to the adjacent sides of the outer body to provide a sealed joint between them. An adapter surrounds the projecting end of the inner body member and is brazed to it.

Formation Fluid Sampling

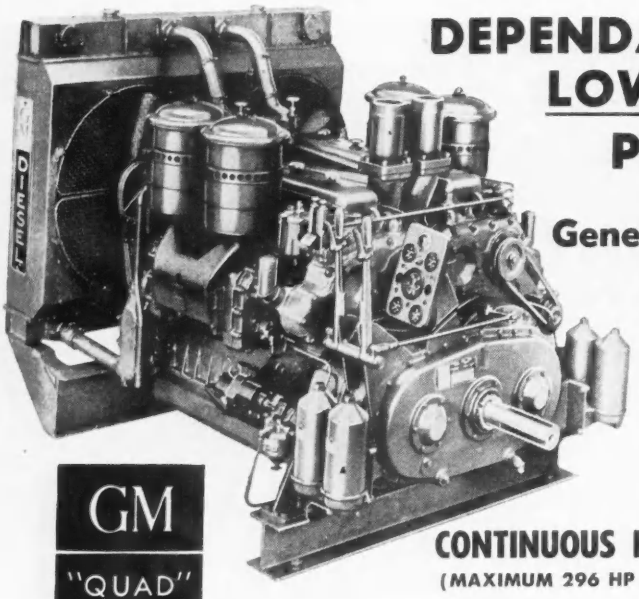
Lawrence S. Chambers, Alhambra, Calif., has patented the design for this apparatus (No. 2,418,500). It is unassigned.

A drill string, with a core head having an enlarged section connected at one end by a sub, and a sampling device designed to be lowered into the core head, constitute the first elements. The sampling device has a barrel, in which there is a piston, and a latch assembly at one end. The latch assembly comprises a swingable latch which may engage the enlarged section so that the weight of the drill string may be placed on the latch to hold the device in place in the core head. A piston rod passes through the latch assembly and is surrounded by a wedge but is freely movable in a vertical direction to engage the latch. A spring suspended from the wedge is compressed between the piston and wedge when the latter is moved into engagement with the latch by the spring's being compressed by the piston. In such instance the wedge will retract the latch when the weight of the drill string is taken off the latch and the piston is moved upward to compress the spring. There is a check valve at the other end of the barrel with which a punch is connected. A conduit in the punch is connected to the valve and barrel so that the punch is driven into the formation when the weight of the drill string is placed on the latch. A means passing through the drill string from the surface and engaging the piston rod induces the latter to raise and thereby withdraw a fluid sample from the formation. This compresses the spring and lifts the wedge into engagement with the latch, unlatching the barrel when the weight of the drill string is raised off the latch, permitting the withdrawal of the sampling device.

Vapor Conserving Tank

The design for this patent (No. 2,418,229) is held by James O. Jackson, Crafton, Pa., and has been assigned to Pittsburgh-Des Moines Company, Pittsburgh.

The tank has an expansible sheet metal roof attached about its circumference, which is annularly supported in its lowermost or unexpanded position while maintaining an outer circular zone of roof for an appreciable distance inside the outer rim of the tank at a height to prevent appreciable angular changes between roof and tank at their line of attachment to each other. The supporting means is adjacent to and spaced radially inward from the periphery of the roof between the axis of the tank of its circumference, and extends above the rim to permit the central portion of the roof to be dished, presenting a convex surface toward the interior of the tank when the roof is deflated.



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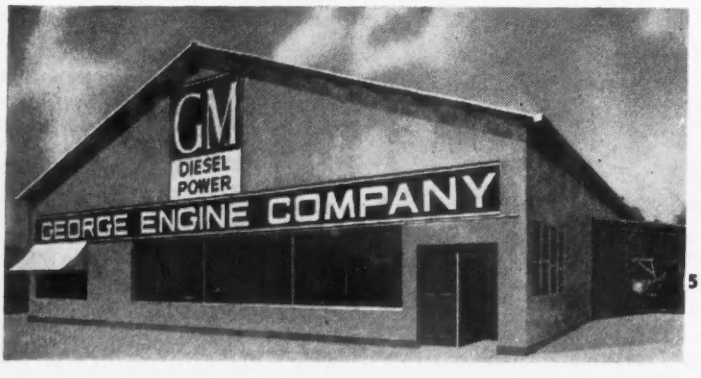

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Manager

U. S. Crude Output Tops 5 Million Barrels for First Time in History

U. S. crude production records were shattered in the week ended May 10, when daily average output reached the 5 million barrel mark for the first time in history, the latest report of The API disclosed. This new mark topped the previous all-time peak set in the middle of last year by 44,000 barrels a day.

The week's refining operations were also stepped up in an attempt to build burning oil stocks, and which were successful in the case of the light fuels, but the heavier oils showed some decline. Crude stocks continued heavy advances and the latest report placed them at the highest level since early March, 1944.

Daily crude production was boosted 54,000 barrels over the previous week's average to the new record-breaking 5,005,000 barrels. This was the first time in U. S. petroleum history that daily output reached the 5 million barrel level, and this new daily rate exceeded the previous all-time high of 4,961,000 barrels a day produced in the week of June 15, 1946, by 44,000 barrels. This latest production figure was 256,000 barrels a day or 5.4 percent over output in the like week of last year.

Crude runs to stills averaged 4,840,000 barrels a day during the week of May 10 to show an increase of 24,000 barrels daily over the previous week's runs and 20,000 barrels over those of last year's like week.

Stocks of refinable crude oil totaled 237,140,000 barrels on May 3, after increasing 1,757,000 barrels in the preceding seven days, according to the Bureau of Mines. That amount represented an increase of 15,229,000 barrels or 6.9 percent over stocks held a year before. This latest stocks count was at the highest level since March 4, 1944, when 237,763,000 barrels were reported by the Bureau.

Gasoline production was lowered 32,000 barrels from the previous week to 14,351,000 barrels for the current period, and stocks of this product were dropped 2,571,000 barrels to the latest total of 100,934,000 barrels. That amount was 2,776,000 barrels or 2.8 percent over inventories of a year ago.

Production of distillate fuel oils was increased 220,000 barrels to total 5,514,000 barrels for the week. Stocks of these light fuels were raised 1,464,000 barrels to the new total of 33,363,000 barrels, which was 1,627,000 barrels or 5.1 percent more than was on hand a year before.

The week's output of residual fuel oils amounted to 8,224,000 barrels, an increase of 388,000 barrels over the previous week. Despite this production hike, stocks of residual were lowered 69,000 barrels to 42,875,000 barrels.

Prices for Most Refined Products Remain Unchanged

Market prices for most refined products remained unchanged throughout the week. However, some advances on gasoline and heavy fuel oils were made. Demand for all products continued at extremely high levels, with gasoline and industrial fuels showing the way and domestic heating oils easing only slightly from winter time rates.

Unprecedented demand for heavy fuel oils from industrial users continued in the Middle West and offerings from refiners were scarce and available only in event the buyer could furnish cars. One marketer in this area reported he had been offered No. 6 fuel at $2 per barrel, Group 3, in buyer's cars and added that he could dispose of it to steel mills at $2.15 to $2.25 per barrel. The mills have been warned that they won't get as much natural gas next winter as they did the past winter, and since they are unwilling to depend on coal, they are laying in all oil they can secure.

Upward trend in heavy fuel prices continued in the Mid-Continent during the early part of the week, as refiners in several districts reported increased quotations. A West Texas refiner formerly quoting $1.80 per barrel for No. 6 fuel reported selling 50,000 barrels to a Midwest industrial account at $2.15, F.O.B. plant, for May and June delivery in buyer's cars. Another refiner in the area also advanced his residual fuel posting to jobbers 14 cents to $1.80 per barrel. In East Texas, a refiner bosted his $1.80 per barrel posting for No. 6 to $2.00.

Quotations for regular-grade gasoline were higher at Philadelphia following one supplier's advance from 9.05 cents to 9.3 cents for tank car lots. In Baltimore a supplier who formerly quoted 8.75 cents, tank cars, for regular-grade advanced his price .55-cent to 9.3 cents effective May 14. A New York supplier reported sale of barge lots of No. 5 fuel oil to jobber for $2.74 and indicated he probably would ask more for additional material.

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.

(All figures in thousands of barrels—add 000)

HIGHS AND LOWS OF RECENT YEARS

ITEM	Crude Oil Prod. Barrels Daily	Crude Oil Prod. Week Ended	Runs to Stills Barrels Daily	Runs to Stills Week Ended	Crude Stocks Barrels	Crude Stocks Week Ended	Gasoline Stocks Barrels	Gasoline Stocks Week Ended	Gasoil and Distillate Stocks Barrels	Gasoil and Distillate Stocks Week Ended	Residual Fuel Oil Stocks Barrels	Residual Fuel Oil Stocks Week Ended
Highs:												
1942	4,337	2- 7	3,961	1- 3	263,208	3-28	[1]109,281	3-14	47,861	11-14	95,857	1- 8
1945	4,944	7-21	[1]5,140	8-18	227,554	10-13	99,012	3-24	45,341	11-17	56,074	1- 6
1946	4,961	6-15	4,968	12-28	229,430	3- 2	105,233	2-16	[1]67,286	11- 9	61,636	11- 2
1947	[1]5,005	5-10	4,986	3-15	237,140	5- 3	107,576	3-29	58,034	1- 4	53,285	1- 4
Lows:												
1945	3,621	10- 6	3,409	10- 6	[2]211,813	8-25	70,791	10-13	26,483	3-17	38,548	5-26
1946	4,403	3- 9	4,498	1-12	218,193	1- 5	85,324	9-28	25,131	3- 9	37,289	4- 6
1947	4,531	4-11	4,667	4-12	220,313	2- 8	94,882	1- 4	31,470	4-19	42,668	4-26

TRENDS OF 1946 AND 1947

Trends in Week Ended	Crude Oil Production Daily	Crude Oil Runs to Stills Daily	Crude Oil Stocks Week End	Gasoline Production Weekly	Gasoline Stocks Week End	Gasoil and Distillate Production Weekly	Gasoil and Distillate Stocks Week End	Residual Fuel Production Weekly	Residual Fuel Stocks Week End
1946:									
January 5	4,548	4,651	218,193	14,488	98,494	5,923	35,199	8,867	42,371
January 26	4,626	4,553	220,544	13,622	101,737	5,720	29,498	8,411	39,722
February 23	4,714	4,595	226,699	13,175	104,709	5,728	25,398	7,913	39,290
March 30	4,425	4,684	224,994	13,896	104,715	5,337	28,240	8,738	37,746
April 27	4,672	4,685	224,443	14,228	99,631	5,568	30,466	9,204	39,404
May 25	4,759	4,857	222,214	14,312	95,769	5,463	32,973	8,908	43,368
June 29	4,957	4,854	223,883	14,500	92,333	5,325	37,762	8,828	46,477
July 27	4,926	4,896	223,756	14,535	88,626	5,817	44,316	8,217	49,517
August 31	4,833	4,911	227,132	15,014	87,217	5,630	53,134	8,539	53,173
September 28	4,778	4,829	223,043	14,675	85,324	5,632	59,827	8,172	57,657
October 26	4,730	4,758	221,184	14,863	86,423	5,710	65,499	7,728	60,872
November 30	4,795	4,707	227,693	15,145	88,371	5,258	66,062	7,672	58,647
December 28	4,713	4,968	225,995	15,604	93,126	5,931	58,941	8,181	53,427
1947:									
January 4	4,649	4,917	223,291	15,281	94,882	5,857	58,034	8,375	53,285
January 25	4,672	4,820	221,655	14,624	99,801	5,630	50,357	8,224	48,558
February 22	4,786	4,860	224,580	14,668	103,904	5,929	40,739	8,542	44,919
March 29	4,865	4,843	227,529	14,396	107,576	5,969	32,737	8,668	43,364
April 26	4,930	4,725	235,383	14,213	103,860	5,435	32,286	8,186	42,668
May 3	4,951	4,816	237,140	14,383	103,505	5,294	31,899	7,836	42,944
May 10, 1947	**[1]5,005**	**4,840**	.....	**14,351**	**100,934**	**5,514**	**33,363**	**8,224**	**42,875**
May 11, 1946	4,749	4,820	[3]221,911	13,903	98,158	5,422	31,736	8,724	41,008
Change:									
In Week	+54	+24	+1,757	—32	—2,571	+220	+1,464	+388	—69
In Year	+256	+20	+15,229	+448	+2,776	+92	+1,627	—530	+1,867
In Year	+5.4%	+0.4%	+6.9%	+3.2%	+2.8%	+1.7%	+5.1%	—5.7%	+4.6%

[1] All time peak. [2] Lowest since December, 1921. [3] Stocks, May 4, 1946.

• Oklahoma

Link for Northeast Elmore And Katie Pools Misses Pay

Pay sand missed on wildcat which was expected to link pools; Oklahoma County wildcat opens oil pool; Derby Oil stakes test in Noble County; wildcat staked by Texas Company in Alfalfa County; deep oil pay at Maysville pool extended south; oil pool may be opened in Cotton County; Antioch field extended south; world's deepest test drilling below 17,426 feet.

Garvin County: A wildcat of The Carter Oil Company, which was believed likely to link the Katie and Northeast Elmore pools, on a shoreline trend, has missed the main pay sand in the two pools. The wildcat, Helvy 1, CSE NW 25-2n-2w, is bottomed at 6510 feet but will be drilled on to the unconformity. Electrical log was run to total depth, showing the Gibson zone at 6409 feet with sand missing. Sandy lime was encountered at 6460 feet with cherty lime at 6501 feet. The well was believed on the "golden horseshoe" trend, following a buried shoreline which designated by other discoveries. Magnolia Petroleum Company's Walston 1, CSW NW 29-2n-1w, remaining wildcat that could possibly link the pools, was drilling at 7039 feet in the Viola lime. Hunton lime was tested before being drilled deeper.

Oklahoma County: The British American Oil Company et al have opened an oil pool with Van Ostrand 1, CSE SW 2-12n-2w. The well flowed 90 barrels of oil in 8 hours through a 20/64-inch choke, making a steady 7 barrels per hour on last 3 hours of the test. Pay is from the Hunton lime, perforated at 6142-65 feet. The pool opener is between the Witcher and Nicoma Park pools.

Noble County: The Derby Oil Company of Wichita, Kansas, has staked a wildcat about 4 miles northwest of Perry townsite, and approximately halfway between the Northeast Sams and the South Polo pools. The test is Wiegel 1, NE NE SE 2-21n-2w.

Alfalfa County: Operators are still trying to give Alfalfa County its first commercial oil production, but to date none has been successful. Latest venture for oil is The Texas Company's McArthur 1, NE SW SW of 18-28n-12w, about 3 miles east of Capron townsite in the northern portion of the county. Mississippian will be the first objective. The company's block comprises about 8300 acres in Sects. 7, 8, 18, 19, 20, 21, 28 and 30-28n-12w, Alfalfa County, and Sects. 11, 12, 13, 14, 15, 22, 23, 24, 25, 26 and 36-28n-13w, Woods County. The wildcat is 20 miles southeast of the South Boggs field of Kansas, nearest production, and lies along the uncharted north rim of the big Anadarko Basin.

Maysville Area: Bromide pay in the Southwest Maysville pool has been extended ½ mile south by Sinclair Prairie Oil Company's Mays 1, NE SE NW 30-4n-2w. On a 90-minute drill-stem test at 7315-58 feet, gas flowed in 7 minutes and oil flowed into pits at an estimated 10 barrels per hour. Recovery was 1260 feet of oil and 360 feet of oil- and gas-cut mud. Crew was drilling ahead and will explore deeper before completing the well.

Cotton County: An oil producer apparently has been brought in by Benton Ross Drilling Company. Dugan 1, SW SE SW 5-5s-12w, south of Randlett townsite, found pay sand at 1577-90 feet and after drilling plug had 800 feet of oil in the hole. At rate of fillup, operators estimated the well good for 100 barrels of oil daily on pump. The test is in an area where a number of dry holes have been drilled, with most of the failures getting some oil in the hole.

Antioch Area: Mid-Continent Petroleum Corporation has extended the Southwest Antioch pool ½ mile south with Ellis 1, NW NW SE 32-3n-2w, adding the 46th oiler to the productive pool. The well flowed 80 barrels of oil per hour for 2 hours on test, and made 78 barrels of oil the third hour, flowing through ¾-inch choke. Pay is from perforations at 6595-616 feet. The well was testing through ½-inch opening while flowing into tanks. Total depth is 6684 feet, with casing set at 6682 feet.

Caddo County: The world's deepest test, The Superior Oil Company of California's Weller 5-11, NW NW NE 11-8n-12w, 5 miles north of Fort Cobb, was drilling below 17,426 feet on May 13. No difficulties have been encountered, and company officials state drilling is proceeding satisfactorily.

Wells Completed in the United States in Week Ended May 10, 1947

Data preliminary and subject to revision. Revised and more complete data on all completions and exploration shown in monthly summaries published in last issue of each month.

State or District	FIELD COMPLETIONS: New Wells: Oil	Dist.	Gas	*Input	Dry	Total	Old Wells Deepened	EXPLORATORY COMPLETIONS: Oil	Dist.	Gas	Dry	Total	ALL COMPLETIONS: This Week	Last Week	This Week 1946
Arkansas	1		1			2		1			2	3	5	6	3
California	32		1		2	35					4	4	39	35	41
Colorado	2					2					1	1	3	4	
Florida															1
Illinois	11				8	19					5	5	24	36	56
Indiana	4		1		2	7					3	3	10	11	9
Kansas	23		8	1	5	37	1				6	6	44	28	47
Kentucky	5					5					1	1	6	5	7
Louisiana	11	4	3		5	23		1		1	2	4	27	23	34
N. Louisiana	7	2	3		5	17		1			1	2	19	15	24
S. Louisiana	4	2				6				1	1	2	8	8	10
Michigan	6					6							6	6	18
Mississippi	11	2			5	18		1			3	4	22	7	6
Montana	3					3					1	1	4	3	
New Mexico	11		2			13					2	2	15	5	5
New York	14		1	16		31							31	23	* 25
Ohio			9		9	18				1		1	19	30	20
Oklahoma	46			2	11	59	8	1		1	10	12	79	63	44
Pennsylvania	20		14	22	6	62							62	47	46
Texas	117	1	2	1	28	149	12	14	2		21	37	198	161	155
DISTRICTS:															
1—S. Central	4					4					2	2	6	6	2
2—Middle Gulf	8	1			4	13		2	1		1	4	17	10	1
3—Upper Gulf	9					9		2	1		2	5	14	16	7
4—L. Gulf-S.W.	9				3	12	2	4			1	5	19	21	30
5—E. Central														3	2
6—Northeast	11		1		1	13							13	11	15
7-B—N. Central	4				5	9	1	2			8	10	29	22	3
7-C—W. Central	1					1							1	5	4
8—West	46		1		3	50	1	2			4	6	57	34	37
9—North	22			1	11	34	8	2			3	5	47	27	62
10—Panhandle	3				1	4							4	6	2
West Virginia	1		10			11							11	18	18
Wyoming	1					1							1	4	
Total U.S.	319	7	52	42	81	501	21	18	2	3	61	84	606	515	535

* Includes salt water disposal wells. [1] Middle Gulf included with Lower Gulf-S.W. [2] East Central included with Northeast. [3] North Central included with North. [4] West Central included with West.

• Kansas

Rooks County Reworked Well Is Apparent Pool Opener

Reworked well apparently opens new oil pool in Rooks County; new oiler assigned potential of 249 barrels daily; attempt to extend Ritz-Canton pool to east fails; Trego County well fails to extend Cotton pool to north; wildcat staked in Barber County.

Rooks County: An oil pool apparently has been opened after successful reworking of an old well. Harbar Drilling Company's Baldwin 1, CNL NE SE 9-10s-19w, 1½ miles west of the Vohs pool, recovered free oil on test through perforations in the Lansing lime from 3446-50 feet, and overnight the hole filled with oil. Lansing was topped at 3410 feet, and water and light oil shows were found at several points through higher perforations.

Aylward Production Company's Silvers 1, NW NW NE 21-8s-19w, discovery well of the new Silvers pool, has been assigned a pump potential of 249 barrels of oil daily from the Arbuckle lime at 3466-73 feet.

McPherson County: An attempt to extend the Ritz-Canton pool to the east has failed. J. M. Huber Corporation's

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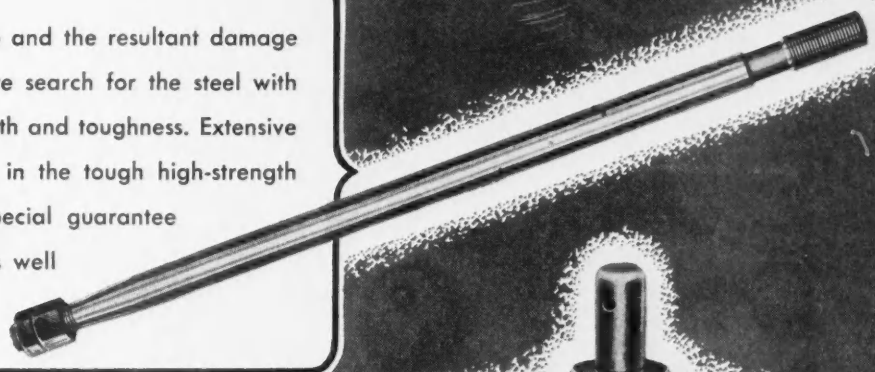

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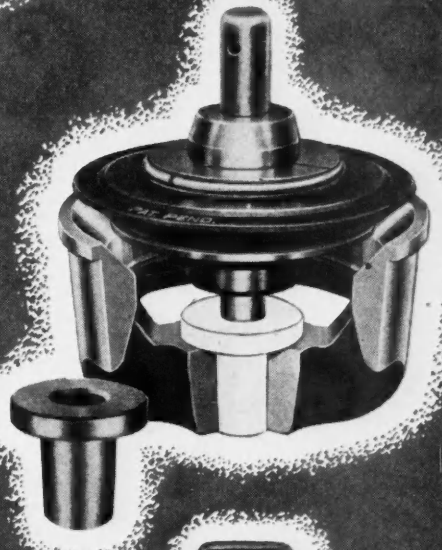

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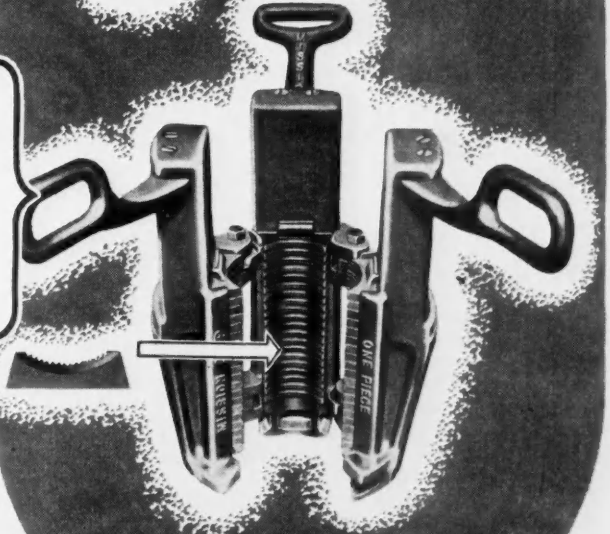

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Thomas 1, NE SE SE 26-19s-1w, was abandoned at 2952 feet in the Mississippi lime, topped at 2879 feet. Oil was found but not in commercial quantities. The Mississippian is the main pay of the Ritz-Canton field.

Trego County: Doley Oil Company failed to extend the 1-well Cotton pool to the north with Schaefer 1, NW NW NE 10-12s-21w. The test has been abandoned in the Arbuckle lime, topped at 4034 feet with total depth 4086 feet. Topeka lime was found at 3359 feet where several oil shows were encountered. Lansing was topped at 3612 feet, Conglomerate at 3954 feet, and Simpson sand at 3995 feet.

Barber County: Location has been staked by J. M. Huber Corporation and associates for Auchenbach & Baker 1, wildcat in NE NE NE of 17-30s-14w. The test is 3 miles northeast of production in the Sun City pool, and probably will be carried to the Arbuckle lime.

• New Mexico

Full-Developed Pre-Permian Beds Logged by Chaves Test

Chaves County Ordovician prospect logs fully-developed pre-Permian beds; Ellenburger pay in Brunson field continues to expand; San Juan County deep prospect testing Morrison zone.

Chaves County: Richfield Oil Corporation et al's Mullis-Federal 1, C SE SW 21-15s-29e wildcat that has changed hands twice, was drilling at 10,530 feet. Top of the Mississippi was recorded at 10,260 feet, and a normal section of Devonian, Silurian and Ordovician beds are in prospect.

Lea County: Amerada Petroleum Corporation's Hare 5, NE SW 33-21s-37e and west offset to the most northerly Ellenburger producer in the Brunson area, landed pipe on bottom at 7856 feet in granite topped at 7844 feet and will complete from perforations at 7805-44 feet. The pay section to be perforated will include the bottom 5 feet of the 174-foot section of Ellenburger dolomite and the underlying 31 feet of oil sand.

Such pay section affords long flowing life and unusually high recovery of sweet crude. Rig has been skidded a location west as a twin to regular and Yesco producers, while the company will drill Walden 4, C NW SE 15-22s-37e, and on the south end of the field which extends 3 miles north-south with a maximum width of 1¼ miles.

Amerada's State 1-D-A, C NW SW 16-21s-37e, north offset to the north extension sector of the Drinkard area, flowed 183 barrels of oil and 23 barrels of acid water, with gas-oil ratio 1344/1, through ¼-inch choke, after acidizing Yeso perforations at 6640-49 feet. The upper portion of the pay was not perforated as a safeguard against excessive gas-oil ratio. Rig has been skidded a location east.

The Texas Company's State 1-A-K, 1¼ miles northeast of the Garrest pumping discovery, and a failure in the San Andres, was drilling at 5830 feet to explore the (Glorietta) Paddock zone.

Union County: The Pure Oil Company's Black Mesa Unit 2, NE SW NE 6-30n-37e, was drilling at 2250 feet on an Ellenburger objective, although the granite is reached at a comparatively shallow depth in this area.

San Juan County: The important wildcat being drilled by Byrd-Frost, Inc., of Dallas and others in the Kutz Canyon area of the San Juan Basin, San Juan County, apparently is a Dakota sand failure and the well may be abandoned. The well is now at 6735 feet, total depth, in the Morrison formation, and has made water on swab tests. This well has been of great interest as the first deep basin test in the general area. Several shows of oil and gas have been encountered in the Dakota section below 6485 feet, but no tests have shown commercial production.

• West Texas

Ellenburger Oil Show to Be Tested by Crockett Wildcat

Crockett County wildcat to set pipe for production test of oil show in Ellenburger; Scurry County wildcat threatened with production blowout from Ellenburger; Mitchell County semi-wildcat confirms production from Clear Fork; deepest producer in Permian Basin trying for more pay.

Scurry County: The Ohio Oil Company's Neal 1-C, R. N. Miller Survey 1, northeast corner of the county and a rank wildcat, was having difficulty in preventing production blowout from Ellenburger due to mud thinning while attempting a drill-stem test at 7246 feet. The Ellenburger was entered at 7230 feet, with elevation 2164 feet, and effective pay was reported to have been logged in the bottom 10 feet of hole. The Ellenburger correlates unusually high to 3 deep failures previously drilled in the county. Nearest Ellenburger production involves the Polar 3-well field in southwestern Kent County. Neal 1-C is ½ mile north of Transcontinental Oil Company and Vacuum Oil Company's Peckham 1, abandoned in 1930 at 4500 feet.

Crockett County: Amerada Petroleum Corporation's University 1-C-T-A, C SE SW Sect. 23, Block 42, wildcat on 647-acre lease acquired at a December 14 University sale for $38,000 cash plus obligation to drill to Ellenburger, was drilling at 8205 feet in Ellenburger broken pay, entered near the 8168-foot level. No production test will be attempted until pipe is set owing to section of crooked hole near the 2800-foot level. The company has a large block of supporting leases that were taken on geophysical information. Top of the Wolfcamp was called at 6130 feet, and base of the black shale at 8102 feet with elevation at 2613 feet. The prospect is 5 miles west by south of Shell Oil Company's University 1, Block 39 area.

Shell's University 1 was drilling at 9060 feet, having tested water at 8991 feet in Wilberns, topped at 8975 feet, or 197 feet low to a second test drilled in the Block 39 area.

Cities Service Oil Company et al's Owen's 1-B, indicated prolific oil discovery in the Pennsylvanian, but a failure in the Ellenburger, topped at 6960 feet, was drilling lime at 7460 feet to explore the Cambrian before plugging back for completion.

Gulf Oil Corporation's University 2-R, ⅓ mile southeast of its Lancaster Hill discovery pumper at 1685 feet, missed the Grayburg pay and was idle at 1797 feet.

Mitchell County: Tobe Foster et al's Brennand-Standard Oil Company of Texas 1, NE NW NE T&P Ry. 4, Block 28, T-1-N, 1¾ miles south of production in the Coleman Ranch field at about same producing level but separated by failures, developed a hole full of oil after a 260-quart nitro shot at 2710-75 feet, having plugged back from 2885 to 2800 feet. This semi-wildcat is 2 miles west of the north end of the Westbrook field, oldest producing area in the Permian Basin, and logged top of San Andres at 1642 feet with elevation of 2171 feet.

Crane County: Gulf's University 1-HH, which has recorded 5 probable oil pays in proving the University-Waddell geophysical prospect, plugged back from 11,060 feet, or 472 feet in the Ellenburger, to 10,933 feet to squeeze formation and exclude bottom-hole water. A final drill-stem test at 11,006-60 feet yielded 98 feet of water-cut rotary mud and 248 feet of sulphur water without oil or gas shows. The main water table apparently was not reached. This wildcat has Ellenburger oil-pay thickness comparable to the best in the Keystone field since gas cap was encountered, while the quality of the oil is on a par with the oil produced from the Ellenburger in the Keystone area.

The Texas Company's Connell 31, wildcat 3 miles west by south of the Jordan-Ellenburger field deep discovery, was drilling at 8055 feet, with the Silurian as the next potential oil source.

Ector County: Gulf and Kewanee Oil Company's University-Kewanee 1-A, ¾ mile southeast of the Jordan field's Ellenburger discovery, was coring at 7310 feet, and correlating about 200 feet low on the Devonian, which tested oil- and gas-cut mud with trace of salt water at 7151-205 feet.

Phillips Petroleum Company's TXL 1-M, 4¾ miles west of Devonian-pay discovery for the Goldsmith area and structurally low, was coring at 10,773 feet in Basal Simpson, with nominal show of oil below 10,763 feet in sandy-lime and shale. Phillips Petroleum Company and Texas were starting Cowden-Limpia Royalty 1, C NE NE T&P 18, Block 44, T-1-N, 2 miles north of Clear Fork production on the north edge of the Goldsmith field and on a southeast geological strike from the Andector-Ellenburger field.

Gaines County: Cities Service's Riley 1, 4½ miles northwest of the Doss field and possibly an extension, pumped 47 barrels of 29-gravity oil and 15 barrels of water initial after nitro shot and acid treatments of Clear Fork at 7039-237 feet, having plugged back from 7251 feet. This strike indicated a larger producer before using a large amount of acid and nitro shot. Honolulu Oil Corporation's White-Shelton 1, 4¼ miles northwest of Riley 1 and about flat structurally, was drilling lime at 6360 feet.

Amerada's Jones 2-A, southeast offset to its Devonian discovery for the Jones Ranch field, was drilling at 11,840 feet to explore the Ellenburger, due near the 13,400-foot level. Devonian was entered at 11,163 feet, or 16 feet high to the discovery, which was the highest of 3 producers and 3 outlying failures. Protection pipe was landed at 11,817 feet, and perforations at 11,740-810 feet, being below the Devonian pay, yielded salt wa-

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ter. No test was made of the thick section of Devonian.

Winkler County: Amon G. Carter et al's Wight-Gulf 1, wildcat that was a contender for producing-depth honors for the Permian Basin, was drilling at 12,390 feet in Ellenburger, topped at 12,265 feet. Acid treatments at 12,359 feet were not effective due to tightness of the dolomite, although the well swabbed and flowed a small amount of oil.

Lamb County: Anton Oil Corporation was starting J. R. Tucker 1-B and O. W. Stephenson 1, situated in east and west sector, respectively, of the Anton 7-well field, to mark the beginning of a substantial drilling campaign. The firm was organized by Bob Etz and E. H. Robertson to operate and develop Anton field leases, bearing 6 pumpers, and outlying acreage acquired last March from Humble for $500,000, with the latter retaining 1/16 overriding royalty. Caroline Hunt Trust Estate, a unit of the H. L. Hunt interests, was starting Snitker 1, offsetting the most westerly producer.

Indian Leases Offered

Sealed bids for oil and gas mining leases on restricted lands of members of the Five Civilized Tribes will be received at the office of Superintendent W. O. Roberts in Muskogee, Okla., until 10 a. m. June 10. Tracts are being offered in Creek, Okmulgee, McIntosh, Okfuskee, Hughes, Seminole, Murray, Garvin, McClain, Grady, Stephens, Jefferson, Carter, Marshall, Love and Choctaw counties.

• West Central Texas

Taylor County Given First Palo Pinto Lime Production

Palo Pinto lime reef in Trent field, Taylor County, records high-gravity oil production; deeper oil pay found in coleman County field, Manning-O'Conner field expanded southeast.

Taylor County: S. B. Roberts and Eastland Oil Company's Tipton 4, offsetting Saddle Creek and Flippen zone producers in the Trent field and a failure in both horizons, established the first Palo Pinto lime production for the county in drilling 21 feet of effective pay ot 4241 feet without water. The Palo Pinto was entered at 4220 feet, with elevation 1852 feet, and pipe set in the pay at 4230 feet for protection against possible bottom hole water. The well tested 12 barrels of 41.6-gravity oil hourly on swab, and headed occasionally after using 2000 gallons of acid through perforations at 4220-30 feet and open hole at 4230-41 feet. The owners control the area with a solid block of 2700 acres, and are starting a south offset to the deep strike. Palo Pinto lime completions will cost from $25,000 to $30,000 equipped to pump.

Coleman County: Sadler and McKissick's Sealy-Smith 2, SWc GH&H Ry. 175, Block 2, and on the northeast edge of the North Novice 3500-foot Strawn oil area, established deeper pay in flowing 480 barrels of 44-gravity oil, with gas-oil ratio 1250/1, natural through 20/64-inch choke from Gray (Strawn) sand at 3714-29 feet.

Jones County: R. H. Roark, L. F. Hooker et al's Brown 1, SE SE Labor 32, League 150, DeWitt County School Lands, near the 4550-foot Strawn discovery pumper for the Pitzer pool, was showing for a shallow-pay discovery in Canyon at 3450-70 feet. A drill-stem test at 3461 feet yielded 1500 feet of oil and 350-feet of oil-cut mud, and 9 feet of additional pay was drilled before landing pipe at 3441 feet.

Stephens County: Fred M. Manning, Inc.'s O'Conner 1-E, T&P Ry. 51, Block 7, nearly a mile southeast extension for the Manning-O'Conner field, flowed 128 barrels of 49-gravity oil, with gas-oil ratio 19,417/1, through 26/64-inch choke from perforations at 3407-12 feet in Bend, topped at 3307 feet with elevation 1434 feet. The firm's O'Conner 1-G, east offset to 1-E, flowed 41 barrels of 49-gravity oil, with gas-oil ratio 17,290/1, through 20/64-inch choke from perforations at 3417-22 feet. Bend was entered at 3262 feet, with elevation of 1444 feet, and barren Ellenburger at 4157-225 feet. Both wells will draw allowable penalty due to excessive gas, but a market is available for the field's large gas reserve.

THE OIL MAN'S CALENDAR

MAY	
21–24	ASME Oil and Gas Power Division, Cleveland, Ohio.
22–23	Natural Gas and Petroleum Association of Canada, Annual Meeting, Hamilton, Ontario, Royal Cannaught Hotel.
22–23	Mid-Continent District, API Division of Production, Spring Meeting, Amarillo, Texas, Herring Hotel.
27–30	Texas A. & I. College, Second Annual Course in Gas Technology, Kingsville.
JUNE	
5– 6	Pennsylvania Grade Crude Oil Association Annual Meeting, Pittsburgh, William Penn Hotel.
16–19	ASME Semi-Annual Meet, Chicago, Stevens Hotel.
25	Rocky Mountain District API Division of Production, Yellowstone National Park, Mammoth Hotel.
26–27	Quarterly Executive Conference, Rocky Mountain Oil and Gas Association Directors Yellowstone National Park, Mammoth Hotel.
JULY 31-AUG. 1, 2	Interstate Oil Compact Commission, Montana. (City to be selected)
25–27	Annual Appalachian Gas Measurement Short Course, West Virginia University School of Mines, Morgantown.
SEPT. 29–30	Annual Meeting Independent Petroleum Association of America, Oklahoma City.
28 to Oct. 2	Regional Meeting, AIME (includes 2-day Petroleum Division Session), Denver.
OCT. 8–10	Fall Meeting, Petroleum Division, AIME, Tulsa, Mayo Hotel.
13–15	Annual Meeting, American Association of Oil Well Drilling Contractors, Long Beach, Calif.
23–24	Fall Meeting, Petroleum Division, AIME, Los Angeles, Elks Club.

Nomads Chapter monthly meetings: LOS ANGELES, second Wednesday, Mayfair Hotel. HOUSTON, second Monday, Ye Olde College Inn. NEW YORK, first Monday, Louis Sherry's. TULSA, third Wednesday, Hotel Tulsa. DALLAS, date not yet fixed.

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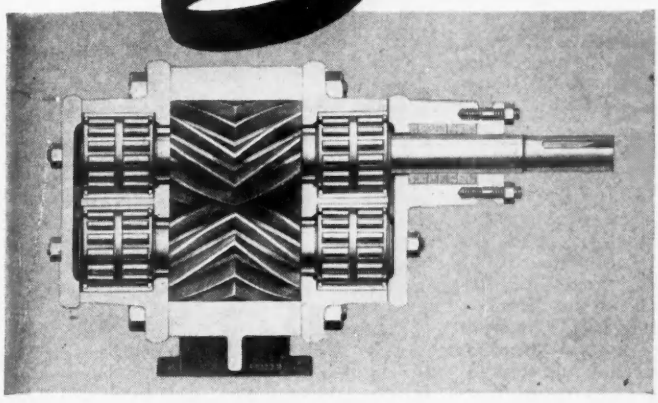
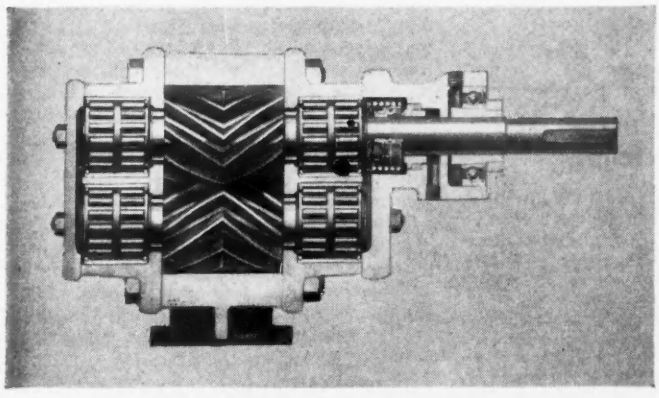
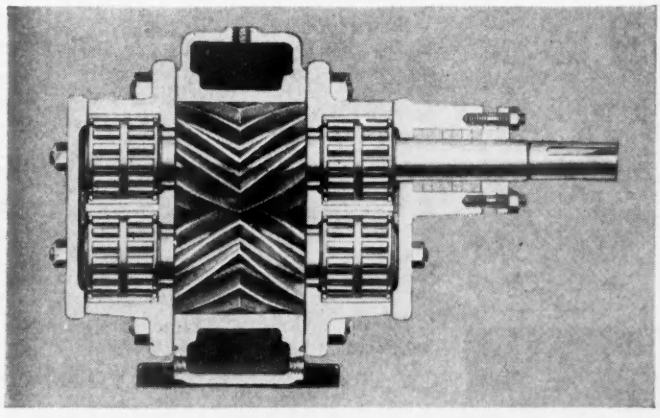


Longitudinal section through standard GR type rotary pump.



Longitudinal section through GRMI type rotary pump provided with mechanical bellows-type seal and inboard bearing for overhung drive.



Longitudinal section through GRJ type rotary pump incorporating steam jacket for pumping asphalt . . . tar . . . grease . . . petroleum jelly etc. Special water jacketed stuffing box is provided for operating temperatures exceeding 350° F.

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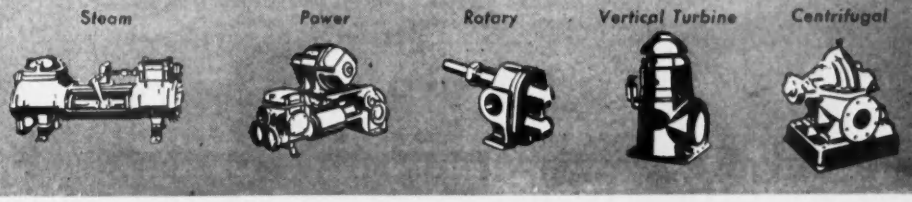

• North Texas

Montague County Discovery Flows After Pressure Buildup

Montague County Strawn discovery flows after pressure buildup; Clay County wildcat tests Bend saturation; Fargo field's Ellenburger-pay discovery rates among largest in district.

Montague County: Continental Oil Company's Magee 1, C. A. Wright Survey A-1052 and 3 miles southeast of Montague, flowed 90 barrels of oil on 4-hour test through ½-inch choke and quit after being shut in 3 days. This wildcat will be equipped to pump, and the production is from Strawn perforations at 6018-38 feet, having plugged back from 6640 feet.

Houston Bowers et al's Howard 1, SWc E½ Sect. 82, Kaufman County School Lands and ½ mile west of an abandoned discovery in the same pay, was rated at 15 to 20 barrels daily after a nitro shot in Strawn at 3013-24 feet.

L. S. Youngblood and Robert Foree's Benton 3, offset to their Bend conglomerate flowing discovery for the Caudle field, was drilling through the Bend section before setting pipe after developing oil flow through tester at 6127-34 feet. The recovery consisted of 450 feet of oil and 400 feet of mud with brackish taste. Benton 3 is slightly lower structurally than the discovery, which was preceded by a failure to the southwest.

Grayson County: Denver Producing & Refining Company's Rich 1, 5 miles south by east of the Handy shallow pool, was abandoned at 13,352 feet in Simpson shale after plugging back and testing 4 barrels of oil and 100 barrels of water daily from Strawn at 8860-940 feet. This wildcat set a depth record for the district.

Clay County: Continental's Keen 1, NE NE Sect. 2698, TE&L Company Survey, and 3 miles south of the Joy field, was preparing to perforate opposite oil saturated lime at 5470-90 feet in Bend, topped at 5465 feet. This wildcat was plugged back from 6518 feet in Ellenburger, topped at 6315 feet.

Wilbarger County: Humble Oil & Refining Company's McCaleb 6, Ellenburger pay discovery for the north end of the Fargo field, registered a natural potential of 2405 barrels of 41.9-gravity oil, with gas-oil ratio 104/1, based on 2-hour gauge through ¾-inch tubing choke from open hole at 6265-345 feet. The well is among the largest in the district, and has been given 3 offsets.

Throckmorton County: Mayflower Properties, Inc.'s Keeter 1, SE SW Sect. 3033, TE&L Co. Survey and 2¼ miles northwest of the Ewalt field, pumped 192 barrels of oil and an unreported volume of water after acidizing Mississippi perforations at 4813-28 feet. This discovery is between 2 near-by Mississippian failures that are 22 feet and 97 feet lower structurally.

Konrad Sztygold, head of Mayflower Properties, Inc., and associates' King 1-B, NE SW AB&M 3, and 1½ miles west by south of a 1-well pool in the 4650-foot Bend, flowed 143 barrels of 42-gravity oil, with gas-oil ratio 516/1, natural on 4-hour gauge through 7/16-inch choke from Basal Bend conglomerate perforations at 4988-98 feet. The well had been shut in for several months awaiting pipe line connection, and flowed considerable water on initial tests. Top of the Bend was called at 4527 feet, with elevation of 1344 feet, correlating 19 feet low to the nearest producer.

• South Central Texas

Edwards Lime Production at Charlotte Field Extended

Edwards lime production at Charlotte extended 1¼ miles northeast; new producer in west extension area of Jourdanton field shows for production; Pearsall wildcat below 9000 feet.

Atascosa County: An important extension at Charlotte field is Humble Oil & Refining Company's Eppright 1, extending Edwards lime production 1¼ miles east-northeast. Total depth is 7000 feet with 5½-inch casing set to 6995 feet and completed from open hole. The well was swabbed in. Drill-stem tests at 6939-47 feet recovered 300 feet of oil, at 6947-57 feet, 175 feet of oil; and at 6990-7000 feet, 100 feet of oil and 10 feet of mud. This well is ½ mile west-northwest of Humble's J. B. Henry 1, Navarro sand producer recently completed to extend Navarro sand production 1½ miles northeast.

Magnolia Petroleum Company's Pearlstone 1 was showing as a producer for the Jourdanton field. A drill-stem test at 7390-97 feet recovered 210 feet of oil in 30 minutes, bottom hole pressure varying from 300 to 3225 pounds. Total depth is 7402 feet with 5½-inch casing set on bottom. This producer is 950 feet south-southwest of Humble's SPJSA Lodge 1, west extension well at the field.

Frio County: Magnolia is drilling below 9010 feet in the Wm. McKinley 1, wildcat 6½ miles northeast of Pearsall. This is a 12,000-foot test and the Edwards lime was topped at 5605 feet.

• East Texas

Fairfield Area Test Has Gas And Water in Cotton Valley

Cotton Valley yields nominal gas flow with water in Fairfield area; Smackover lime may have been reached by Hawkins field flank test; Bowie County wildcat is failure in Paluxy.

Freestone County: The Texas Company's White 1, west outpost for the Fairfield multi-pay area and the deepest test in the district, headed a small volume of gas, drilling fluid and water from lower Cotton Valley perforations at 11,292-306 feet during a 4-hour drill-stem test. Additional perforations at 11,156-72 feet also yielded gas-cut mud and water. Treatment of the lower perforations with mud acid resulted in a gain in the volume of gas and water-cut drilling fluid, and further tests will be made. White 1 was drilled to 14,331 feet in Smackover lime, then plugged back to set liner at 11,417 feet.

Wood County: Humble Oil & Refining Company's McKnight 1, northeast edge of the Hawkins field, was idle at 13,427 feet in shale and lime to check formation samples, which indicated that water may have been reached in the Smackover zone.

Humble's Rio Oil Corporation 1, East Yantis Travis Peak prospect, tested water in Woodbine at 4805-60 feet, and was drilling at 5020 feet. It is near a Paluxy failure drilled by George Strake that proved structurally high for the area.

Bowie County: W. M. Coats et al's Hall 1, Colledge Hill prospect, was awaiting orders at 3948 feet after showing water in the Paluxy, topped at 3550 feet, with elevation 376 feet. The Glen Rose was entered at 3925 feet.

Tide Water Associated Oil Company-Seaboard Oil Company's Dalby-Joiner 2, D. Puckett Survey and southeast offset to their recent 4825-foot Paluxy failure, was drilling shale at 3710 feet. The first test cut the fault slightly low, and owners elected to drill their second test.

Houston County: Magnolia Petroleum Company's Grounds 1, J. C. Luce Survey and 6 miles southeast of Grapeland, cemented 5½-inch casing at 9009 feet, with the hole bottomed in the Rodessa at 10,436 feet, to perforate opposite possible oil pay in the Glen Rose at 8023-45 feet.

Drilling Firm Formed

The old company known as E. K. Carey Contractor, has been reorganized to include C. M. (Sam) Powell as a member of the firm. A Kansas charter has been granted to Carey-Powell Drilling Company, Inc., with E. K. Carey of Denver, C. M. Powell of Oklahoma City, and Mark H. Adams, attorney of Wichita, as incorporators. Officers and directors are E. K. Carey, president; C. M. Powell, vice president, and H. Dungan, secretary.

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• Southwest Texas—Lower Coast

San Salvador Gas-Condensate Production Extended South

San Salvador gas-condensate production extended 1¼ miles south; gas field discovered in Duval County; casing set in wildcat northeast of Agua Dulce; wildcat southwest of Adami field completed as a discovery.

Hidalgo County: Magnolia Petroleum Company's Santa Cruz Farms 1, a 1¼ miles south extension for San Salvador field, has been given potential test. It gauged 11½ million cubic feet of gas daily on open flow, along with an ungauged amount of condensate. Tubing pressure was 2400 pounds while flowing on ⅜-inch choke, and shutin pressure, 3400 pounds. Total depth is 11,003 feet with 7-inch casing set to 9400 feet and perforated at 7672-92 feet for completion. Production tests were made in deeper sands but they failed to show for commercial production.

Duval County: Rowden & Rowden et al's John Akin 2, wildcat 2 miles southeast of Cedro Hill field, has been completed as a gas field discovery. Total depth is 2458 feet with 5½-inch casing set on bottom and perforated at 2444-47 feet for completion. The well flowed gas with 900 pounds shutin pressure. A drill-stem test at 2434-41 feet developed 385 pounds working pressure in 8 minutes through ¼-inch chokes top and bottom and recovered 2 gallons of mud.

Nueces County: Casing has been set in Curtis Singleton & W. H. Wallace's Mantor & Briggs 1, wildcat 5 miles northwest of Banquete and 5 miles northeast of Agua Dulce. Total depth is 6686 feet and an electric log and sidewall samples were taken prior to setting casing. A drill-stem test at 6635-37 feet developed 25 pounds working pressure in 30 minutes through ¼-inch chokes top and bottom and recovered 300 feet of oily mud with 1350 pounds bottom hole pressure open and 1600 pounds closed.

Webb County: M. L. Massingill et al's George B. Parr 2, wildcat 5 miles southwest of Adami field, is being completed as a field discovery. The well cored saturated sands in the Mirando zone at 880-91 feet and set 5½-inch casing to 880 feet. Well is being completed in open hole with total depth 891 feet. Locations have been made for Parr 3 and 4. The No. 3 well is 660 feet west of the discovery and the No. 4 is 660 feet north of the discovery.

Stanolind High Bidder

Stanolind Oil & Gas Company was high bidder at a sale of tribal lands in the Navajo Indian Reservation, Apache County, Arizona, on May 8. A total of $104,644.80 was bid by Stanolind on two tracts totaling 6240 acres. The lands are in the vicinity of the Black Mountain Trading Post. This sale is the first in recent years covering lands in the Black Mesa area of northeastern Arizona, and indicate that active exploration may be expected in the area during the coming year.

Cities Service Consolidates

Cities Service Oil Company has consolidated into one district the West Texas and Texas Panhandle natural gasoline operations, with Loyal Davies as district superintendent. District headquarters will be at Pampa.

Davies formerly was district superintendent in charge of the company's natural gasoline plants in the Oklahoma City and Seminole, Okla., areas. He will be succeeded there by Frank Allen, who has been in charge of the Oklahoma City gasoline plant.

Allen will take over responsibilities in connection with Cities Service's chemical crude plants, located in the Seminole-Oklahoma City territory.

Dave Godsy will succeed Allen as superintendent at Oklahoma City.

• Middle Texas Coast

Oil Discovery Completed North of Refugio Townsite

Discovery north of Refugio completed; potential run on new deep sand discovery at Bonnie View; Yoward confirmation test at 7450 feet; Amerada coring in Bloomington confirmation test.

Refugio County: Wil-Tex Oil Corporation's Hynes 3-A has been completed as a field discovery 2 miles northeast of Refugio townsite and north of Refugio field oil production. On potential the well flowed 137 barrels of 37.5-gravity oil daily through ⅛-inch choke with tubing pressure 925 pounds and

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casing pressure 1825 pounds, gas-oil ratio being 875/1. Total depth is 7015 feet with 5½-inch casing set to 6830 feet and perforated at 6336-40 feet for completion. This producer is 2250 feet northwest of Hewit & Dougherty's Hynes 3-C, a gas well. Wil-Tex previously drilled 2 gas wells in this area but this is the first oil producer.

P. R. Rutherford's Henry Schirmer 12 has discovered a deep oil pay zone at Bonnie View field. On potential the well flowed 140 barrels of 40.5-gravity oil daily through ⅛-inch choke. Gas-oil ratio was 2092/1, tubing pressure 1350 pounds and casing pressure 2010 pounds. Total depth is 6916 feet with 5½-inch casing set to 6451 feet and perforated at 6178-84 feet for completion. Most production in the field comes from the 4500 foot sand.

Bee County: Gasoline Production Corporation & Sunray Oil Corporation's Yoward 1-A, confirmation test in the new Yoward field, was preparing to run electric log to total depth of about 7450 feet. This test is 1320 feet northwest of the discovery well, completed this month as an excellent producer from perforations in the Slick sand at 7483-93 feet. This producing area is 1¼ miles west of Mineral field.

Victoria County: Amerada Petroleum Corporation was coring the Stubblefield Unit 1, confirmation test in the new Bloomington field. Located ¼ miles northwest of the Alexander 1 discovery in Bloomington townsite, the Stubblefield 1 was coring at 4480 feet. Alexander 1 was recently completed from perforations at 4904-09 feet for 155 barrels of oil daily on 5/32-inch choke.

• Upper Texas Coast

Producing Area Is Opened South of Hutchins Field

Producing area opened south of Hutchins field; confirmation on South flank of Boling dome shows for production; discovery being completed south of Lucky field; north outpost at North Cheek flowing gas and condensate; Rosenberg area wildcat abandoned; gas well completed 3 miles east of Humble production.

Wharton County: A producing area has been opened south of Hutchins field by Sid Richardson's Lacy W. Armour et al 3. On potential the well flowed 177 barrels of 29.2-gravity oil daily through 10/64-inch choke with gas-oil ratio 1888/1. Total depth is 6000 feet with casing perforated at 5889-92 feet in the Frio for completion. This well is on a 346.61-acre lease in I&GN Survey, Sect. 22, and 2800 feet south of the No. 2 dry hole which will be reworked.

Sparta Oil Company and Mikton Oil Company's A. A. Mullins 2, confirmation test on the south flank of Boling dome, has indicated production. Located 400 feet southeast of Cecil Hagen's Mick 1 south flank discovery, Mullins 2 recovered 465 feet of 29-gravity oil with 700 pounds bottom hole pressure flowing and 1950 pounds bottom hole pressure shut in on a 15-minute drill-stem test at 5011-21 feet. Following this test hole was cored ahead. Hagen's Mick 1 was completed from perforations at 5062-66 feet.

Matagorda County: Stanolind Oil & Gas Company's Marcus D. Huebner 1 was being completed as a discovery 2 miles south of Lucky field. On initial test the well flowed 28 barrels of 38-gravity oil in 10½ hours, flow being through ¼-inch choke. Flowing pressure on the tubing was 1775 pounds, on casing 700 pounds, and gas-oil ratio 31,000/1. Total depth is 12,776 feet with 7-inch casing set to 9496 feet and perforated at 9236-38 feet for completion.

Jefferson County: Floyd Karsten's J. H. Phelan 6, outpost on the north side of production at North Cheek in Samuel Stivers Survey, was being completed as a gas-condensate producer. Total depth is 8380 feet with completion made through 7-inch casing at 8180-90 feet. On completion test the well cleaned through 10/64-inch choke, flowing gas and condensate with 2100 pounds flowing pressure on the tubing and 2800 pounds on the casing. The original hole was drilled to 8341 feet where it blew out and bridged over. Hole was then plugged back and sidetracked at 3420 feet and drilled to present total depth.

Fort Bend County: H. W. Snowden's Mary Hobbs 1, wildcat in the Rosenberg discovery area, has been abandoned. Hole was drilled to 9015 feet and numerous production tests made. A sand in the Lower Yegua at 7956 feet with show of oil was tested but would not flow.

Harris County: Gas production has been discovered on the east flank of Humble dome 3 miles from production by Houston Oil Company of Texas' Eugene L. Bender Estate 1. Total depth is 8600 feet with 5½-inch casing set to 8402 feet and perforated at the 7780-foot level for completion. The well flowed 3,601,000 cubic feet of gas daily through ¼-inch choke with 2440 pounds flowing pressure on the tubing and shutin pressure of 2715 pounds.

Record Lease Price

Records for high-priced leases at the Five Civilized Tribes agency at Muskogee, Okla., were broken May 13 when Republic Natural Gas Company and Grisso Royalty Corporation paid $186,100 for lease on a 120-acre tract near the old Knox field of Southern Grady County. The tract is on the northwest end of the Knox field where The Ohio Oil Company recently developed a new sand.

• South Louisiana

Confirmation Well Completed In Holmwood Producing Area

Sohio and Gulf complete confirmation oiler in new Holmwood producing area; Barnsdall completes fourth producer at Longville; wildcat on Scott-Duson prospect tests for production; Gulf retests wildcat in Bayou Boullion area; Big Island Tuscaloosa production extended ½ mile north.

Calcasieu Parish: Sohio Petroleum Company and Gulf Refining Company's W. E. Walker et al 1 has been completed as a confirmation oiler in the new Holmwood field. Located in 26-10s-7w, and 2650 feet due east of the discovery in the field, Walker 1 flowed on initial gauge 248 barrels of 38.6-gravity oil daily through 8/64-inch choke. Tubing pressure was 1600 pounds, casing sealed, and gas-oil ratio 703/1. Total depth is 10,915 feet with 7-inch casing

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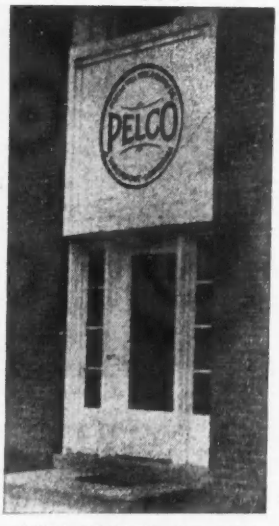

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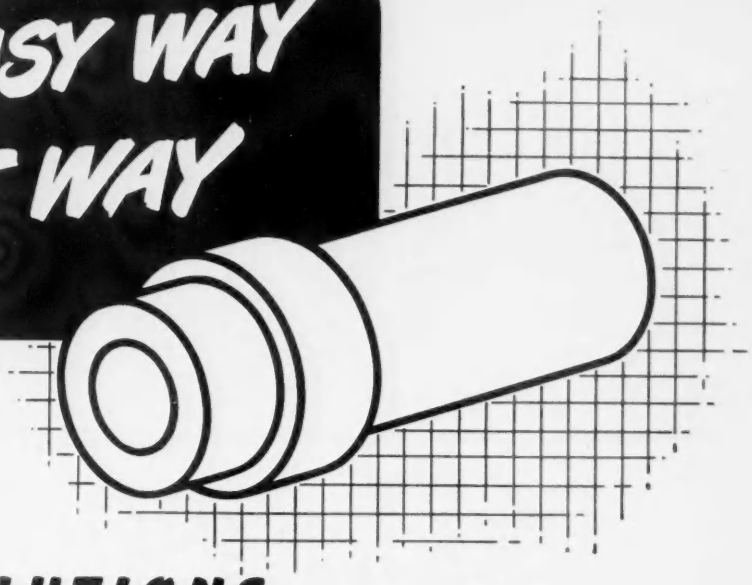

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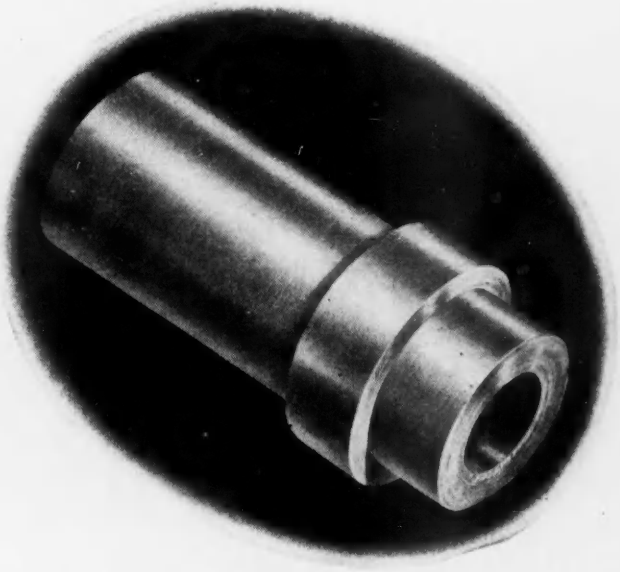

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set a foot off bottom and perforated at 10,280-305 feet for completion.

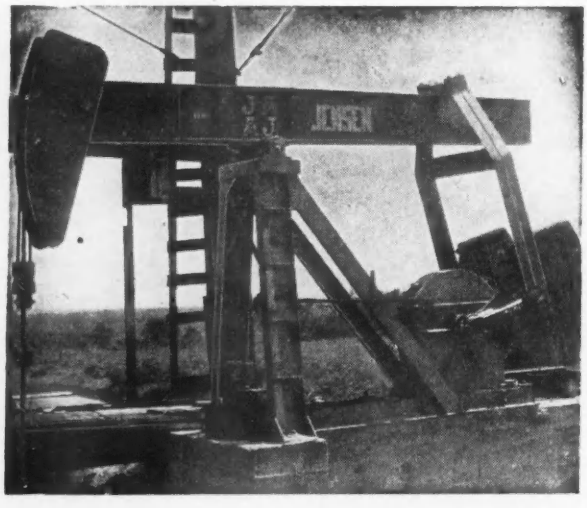
Beauregard Parish: Barnsdall Oil Company's M. E. Cooley Estate 1 is a producer and the fourth well completed in the new Longville field. On potential the well flowed 227 barrels of 49.9-gravity oil daily through 10/64-inch choke with 1800 pounds pressure on tubing and 1850 pounds casing pressure, gas-oil ratio being 1873/1. Total depth is 8239 feet with casing set to 8206 feet and the well completed from open hole. This producer is the north offset to the Long Bell Lumber Company 3 well and is in 6-6s-9w.

Lafayette Parish: Union Sulphur Company's Harson Unit A-1, wildcat on the Scott-Duson prospect 11 miles east of Crowley field in Acadia Parish, is being tested as a prospective discovery. A drill-stem test at 10,840-56 feet flowed gas and condensate with 3500 pounds working pressure. Total depth is 12,067 feet.

Iberville Parish: Gulf Refining Company is retesting A. M. Cotton et al 1-A, wildcat 2 miles southeast of Bayou Boullion in 49-9s-2w. Total depth is 11,876 feet with casing perforated at 10,333-54 feet for tests.

Rapides Parish: Union Producing Company et al's A. N. Floyd 1 has been completed as ½-mile north extension to Tuscaloosa sand production at Big Island field. On potential the well flowed 219 barrels of oil daily on 12/64-inch choke with tubing pressure 870 pounds, casing pressure 1550 pounds, and gas-oil ratio 1382/1. Total depth is 9840 feet with casing perforated at 9654-80 feet for completion.

GET TOUGH
When Buying - - -



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• North Louisiana

Oil Discovery Indicated For Natchitoches Parish

Oil discovery indicated in Natchitoches Parish; gas area opened near Bryceland in Bienville Parish.

Natchitoches Parish: Jack F. Lent's E. L. Whatley 1, 20-10n-10w, is regarded as a good oil prospect. The well has been testing an unestimated amount of gas, oil, wash water and mud into pits with casing pressure 740 pounds. After being shut in overnight pressure increased to 1050 pounds. Zone perforated is in the Paluxy opposite 3270-95 feet. Total depth of the hole is 3520 feet, with elevation reported at 218 feet. Paluxy was topped at 3250 feet.

Bienville Parish: Lion Oil Company has discovered gas production in wildcat territory 3 miles east of Bryceland. L. E. Ozley 1, C SW NE 13-17n-6w, perforated with 216 shots from 7796-836 feet in the Travis Peak, is estimated to be flowing between 50 and 100 million cubic feet of gas a day, with a small amount of distillate. Total depth of the discovery is 10,740 feet, with plug-back job completed at 7864 feet.

Red River Parish: R. O. Roy-British American Oil Producing Company's Trixie Wimberly 1, 2-13n-10w, having run electrical log is waiting on orders. Report is that operators will set pipe, but no shows have been reported. Total depth is 7508 feet.

• Arkansas

Paluxy Production Is Third Pay for Spirit Lake Field

Paluxy production, third pay zone, found in Spirit Lake producer.

Lafayette County: A third pay zone was established for Spirit Lake field with completion of Austin E. Stewart, H. G. Lewis, Jr., and Crow Production Company's H. Moore Estate 2, C NE NW SE 14-16s-25w. Production is from Paluxy sand at 3582-602 feet, which was perforated with 120 shots. The well flowed 16 barrels of oil per hour or 384 barrels daily through ¼-inch choke. Gas-oil ratio and gravity of oil were not revealed. There are now 7 wells in the field with 3 rated as discoveries. Other production is from the Glen Rose and the Kilpatrick zone.

McAlester Fuel Company's C. Lee A-1, C NE SW 24-17s-24w, wildcat 7 miles south of Lewisville, is drilling at 7359 feet. Massive anhydrite was topped by samples at 4360 feet, Cotton Valley at 6523 feet.

Hempstead County: Barnsdall Oil Company-Sohio Petroleum Company's Schults 2, wildcat in C SW SW 34-13s-26w, topped Paluxy by samples at 1781. Massive anhydrite at 2565 feet, and is drilling below 2640 feet.

Drew County: Curtis Kinard's wildcat, A. S. Reinhart 1, C NW SE SW 15-12s-6w, Desha Basin area, is nearing contract depth and is drilling below 4325 feet. No shows were found in a core at 3600 feet.

Union County: J. L. Perry, Tr.'s Callie Dupe 1, wildcat in NE NW 13-18s-13w, 3 miles southeast of Urbana field, was testing perforations at 3149-51 feet. Total depth is 3503 feet.

• Mississippi

12,000-Foot Test Is Staked Between Heidelberg Fields

Jasper County to get 12,000-foot test; Superior's second deep test in Forrest County abandoned.

Jasper County: Danciger Oil & Refining Company's C. J. Simmons 1, NEc 36-1n-12e, is a new location for a 12,000-foot test on the flanks of the West Heidelberg segment between that field and East Heidelberg. Present production in the 2 fields is from the Eutaw at approximately 5000 feet. Several tests have been made in this area which finally established a definite fault zone for the 2 segments of the field. Each of these fields contains four reservoirs in various sands of the Eutaw, but all attempts to establish communication have only developed the fault pattern. In the only other deep test in this same general section Gulf Refining Company abandoned G. S. Stanley 1, in the Eucutta field of Wayne County at a total depth of 11,053 feet with no shows indicated at the lower levels.

Forrest County: The Superior Oil Company's Maria Draughn 1, NEc 12-3n-13w, second of the company's 2 deep tests in the county, was finally abandoned at 12,141 feet. The company has given out no information on the well beyond the fact that a drill-stem twisted off at 10,281 feet and hole was plugged back to 9700 feet from that depth. Final abandonment could have been brought about by additional trouble farther down the hole. If, however, 12,000 feet was the scheduled depth for the well it might be significant in discounting shows with commercial potentialities that were rumored below that depth in the company's Cassie Bradford 1, which was shut down at a total depth of 15,730 feet several months ago with no information available. If the Bradford did succeed in establishing commercial production the abandonment of the Draughn at the 12,000-foot depth would indicate that such production was found at shallower depth, possibly in the Massive sand zone at approximately 10,000 feet or 11,900 feet.

Adams County: Big Chief Drilling Company's F. M. Baker 1, NWc 34-6n-2w, has been successfully completed to extend the rapidly expanding LaGrange field ¾ mile southeast. The well was drilled to the productive 6200-foot zone of the Wilcox and perforated at 6179-84 feet. After various tests during which some trouble with salt water was encountered, it finally flowed 115 barrels of oil per day through ⅛-inch tubing choke with no salt water input. In the Carthage Point field The Pure Oil Company's L. S. Stanton 1, SW 11-6n-3w was finally abandoned as a duster at 10,578 feet with no shows of commercial importance. The failure was disappointing in view of the fact the field's only well is a fairly good producer and its was hoped that the Stanton would extend production well to the east. Cores from the Massive sand zone at 10,230-40, 10,240-42 and 10,227-35 feet had fair oil odor but failed to develop.

Jones County: Gulf's L. L. Majors 1, SEc NE 29-6n-11w, deep wildcat was running core tests below 11,718 feet. Cores taken at 11,701-06 feet yielded flaky shale with no shows indicated.

Marion County: Humble Oil & Re-

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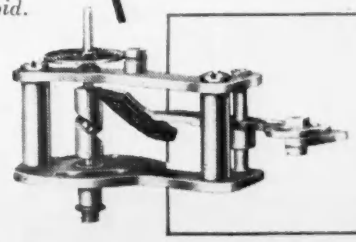

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fining Company's C. Tullos 1, SWc 12-1n-18w, which had previously indicated shows in cores of the Lower Tuscaloosa zone below 9000 feet was drilling in shale and sand at 10,600 feet. Last drill-stem test at 10,102-23 feet had a slight blow but recovered only mud and salt water.

Florida

Humble Oil & Refining Company, which is drilling all but 1 of the tests active in Florida, seems assured of a new producer in the Sunniland field of Collier County. Gulf Coast Realty 5, SW SW 20-48s-30e, took a drill-stem test of perforations from 11,562-78 feet. Fluid rose to the top in less than 12 hours, and subsequently the well flowed 6.4 barrels an hour for 6 hours, with a gas-oil ratio of 136/1. Oil was of 25.1-gravity.

Humble's wildcat, Lee Cypress Lumber Company 3, SE SE 28-47s-29e, Collier County, took cores, reamed, and was being tested by geophysical crew. The well is in anhydrite at 11,943 feet. A drill-stem test at 11,804-25 feet obtained oil-cut mud.

Palm Beach County: Humble's Tuscon Corporation 1, SWc 35-43s-40e, ran core tests around 10,525 feet without obtaining shows. Drilling is below 10,812 feet.

300 Tour Ouachitas

Approximately 300 geologists and land men took part in a three-day tour of the Western Ouachita Mountain region of southern Oklahoma, which was led by Thomas A. Hendricks, U. S. Geological Survey.

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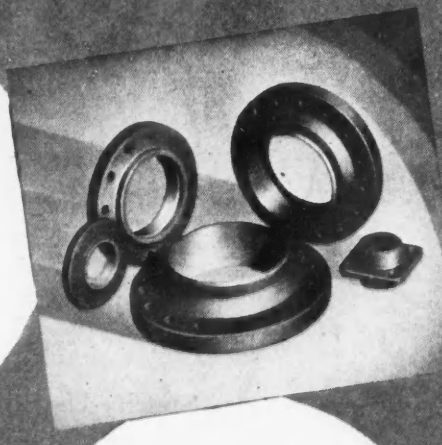

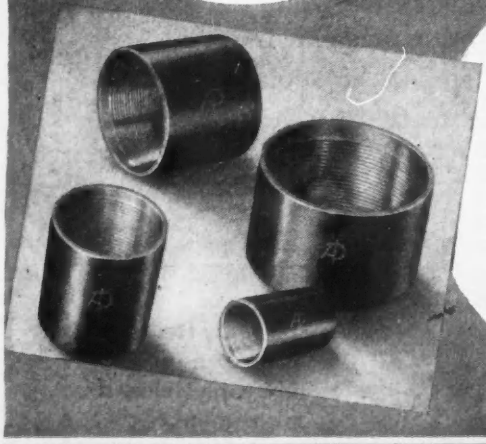

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• Ohio

Thick Section of Newburg Gas Sand Tapped in Wayne County

Newburg gas found in Wayne County; gas extension made at Zoar; Hemlock Grove extension test drilling.

Wayne County: An unusually thick Newburg gas sand at 2684-723 feet was found by Ohio Fuel Gas Company in the F. E. Harstine (Cliffe) 1, SE NW 2 Clinton township. The well was tubed at a natural gauge of 625,000 cubic feet and it may be acidized before completion. The test is 1 mile northwest of the Millbrook pool in the eastern part of the Township.

Muskingum County: Wasson Company's O. R. Downing 1, NW SE 36 Salt Creek township, ¾-mile east extension to the field, ran into a gas pay in the Clinton at 4451 feet that was gauged at 750,000 cubic feet. The well caught fire and burned the rig down before it could be drilled in.

Tuscarawas County: Wm. Pfeiffer's Corundite Refractories 2, Lot 74, Lawrence Township, 2000 feet southwest of the No. 1, reported pays in the Red and White Clintons. The sand at 4707-75 feet made a total of 800,000 cubic feet of gas natural, and after a shot, the gauge was 1,550,000 feet.

Meigs County: An important test 1¼ miles south of the Hemlock Grove pool is being drilled by Ray Piersol et al on Wm. A. Will, SE SW 6 Chester township. The south extent and direction of the pool may be determined by this test.

• Illinois Basin

Indiana's Springfield Pool Area Gets Two Discoveries

Posey County, Ind., gets 2 discoveries; new pay zone tapped in White County, Ill., field.

Indiana

B. M. Heath's Highman Heirs 1, SW SE SW 31-5s-13w, Posey County, 1¼ miles south of the Springfield pool, is the discovery of the Solitude pool with production from Palestine sand at 1965-80 feet. In initial tests the well pumped 270 barrels of oil in 24 hours natural.

The Texas Company's Golden 1, NE NW SE 19-5s-13w, ¾ mile east of the Springfield pool, has pipe set to test Waltersburg sand at 2115-24 feet.

Illinois

W. O. Allen's Brimble-Comb 1, SE 28-5s-10e, White County, is giving the East Epworth pool a new pay horizon. Following a 40-quart shot, the well swabbed 540 barrels of oil in 24 hours from Tar Springs sand at 2360-70 feet.

Gallatin County: R. B. Martin and associates' Davis 1, NE NE SW 1-8s-8e, ¼ mile east of the East Omaha pool, is cleaning out and testing after a 20-quart shot in Tar Springs sand at 2115-25 feet. The well showed some free oil when plug was drilled.

White County: Heldt Drilling Company's Hill-Endicott 1, NW SW NE 28-3s-10e, 3 miles from production in the Crossville area, was cleaning out and testing Benoist sand at 2990-3005 feet after drilling to McClosky, dry at 3142 feet.

• California

Kern County Has Six of 13 New Locations in State

Wildcatting activity takes spurt with 6 locations announced for Kern County alone; 2 gas tests start in Solano County; third well in new Fresno County producing area is failure; Texas Company swabs for production in Monterey County wildcat; court bars deep test within Santa Barbara city limits; 2 intervals to be tested in wildcat in Santa Barbara County.

Kern County: Six new locations out of 13 for the state were announced for this county. For the most part, the locations indicate a disposition to sharp-shoot for new pools or extensions to existing fields.

Interest in the possibilities of territory around Wheeler Ridge continues, with Richfield Oil Corporation grading location for Wheeler Ridge-K.C.L. A-1 in 20-11n-20w, about ½ mile northwest of the Wheeler Ridge field. This is the only side of the field not previously prospected.

Richfield also will drill an outpost test, Paine 1, about ½ mile north of the Williams field in 36-27s-19e, a small low-gravity producing area discovered by Shell Oil Company 5 years ago.

Caliente Oil Company will try for schist production 1 mile north of the Edison field in 12-30s-29e where location has been made for Cohn Estate 1.

Shell's Guth McCaleb Community 1, 6 miles east of McFarland, is the only wildcat scheduled for early spud that is miles from existing production. Some prospecting has been done 2 or 3 miles southwest, but without success.

Seaboard Oil Company's new discovery in the Bacon Hills area, Seaboard-Bandini 3-21 in 21-28s-20e, was pumping 56 barrels of 42-gravity clean oil. Derrick has been erected for 24-21, an offset.

Solano County: A steady wildcatting campaign for new natural gas sources is continuing in the northern part of San Joaquin Valley. Two miles northwest of the Maine Prairie gas field in 22-6n-2e Amerada Petroleum Corporation was rigging up to drill Wineman Community 2. Four miles east of the Kirby Hills gas field in 15-4n-1w Standard Oil Company of California has staked Scalley Estate 2.

Fresno County: The Superior Oil Company has abandoned Hackala 75 in 32-15s-17e at 7242 feet. The well is about ¼ mile east of the company's recent Hackala 55 discovery. That further production will be found largely west of the discovery is evident from the successful completion of Superior's Keisson 35-32. Union Oil Company has a location for Waechter 24-32 northeast of the discovery well, but Union's well may not be drilled in view of the failure of Superior's second Hackala well.

Sharples Oil Corporation's Northeast Coalinga outpost discovery, Hyde 1 in 6-19s-16e, is not yet back on production. Intervals at 8268-77 and 8297-308 feet will be reperforated and an attempt made to swab the well back on production.

Humboldt County: J. M. and O. F. Fowler have staked a wildcat in 15-3n-1w, between the town of Eureka and The Texas Company's Tompkins Hill gas field. Location is ½ mile north of the gas field.

Monterey County: Texas has perforated 5 intervals at 4755-5625 feet in its Honolulu-Thorup-USL 1 wildcat in 4-20s-7e near King City and was swabbing for production. Oil production in commercial quantities has yet to be discovered in this county despite a persistent wildcatting campaign extending over the last quarter century.

Santa Barbara County: Trans-Oceanic Oil Corporation's M'divani 8 on 28-4n-27w, which was to have been a deep test in the Santa Barbara Mesa field, will not be drilled. A drilling permit, obtained before the war and prior to the passage of a Santa Barbara city ordinance banning drilling within the city limits, was declared invalid by the court.

Sunray Oil Corporation was reaming hole preparatory to testing 2 Miocene intervals above 5000 feet in Los Flores 1, wildcat 1 mile east of the Orcutt field in 4-8n-33w.

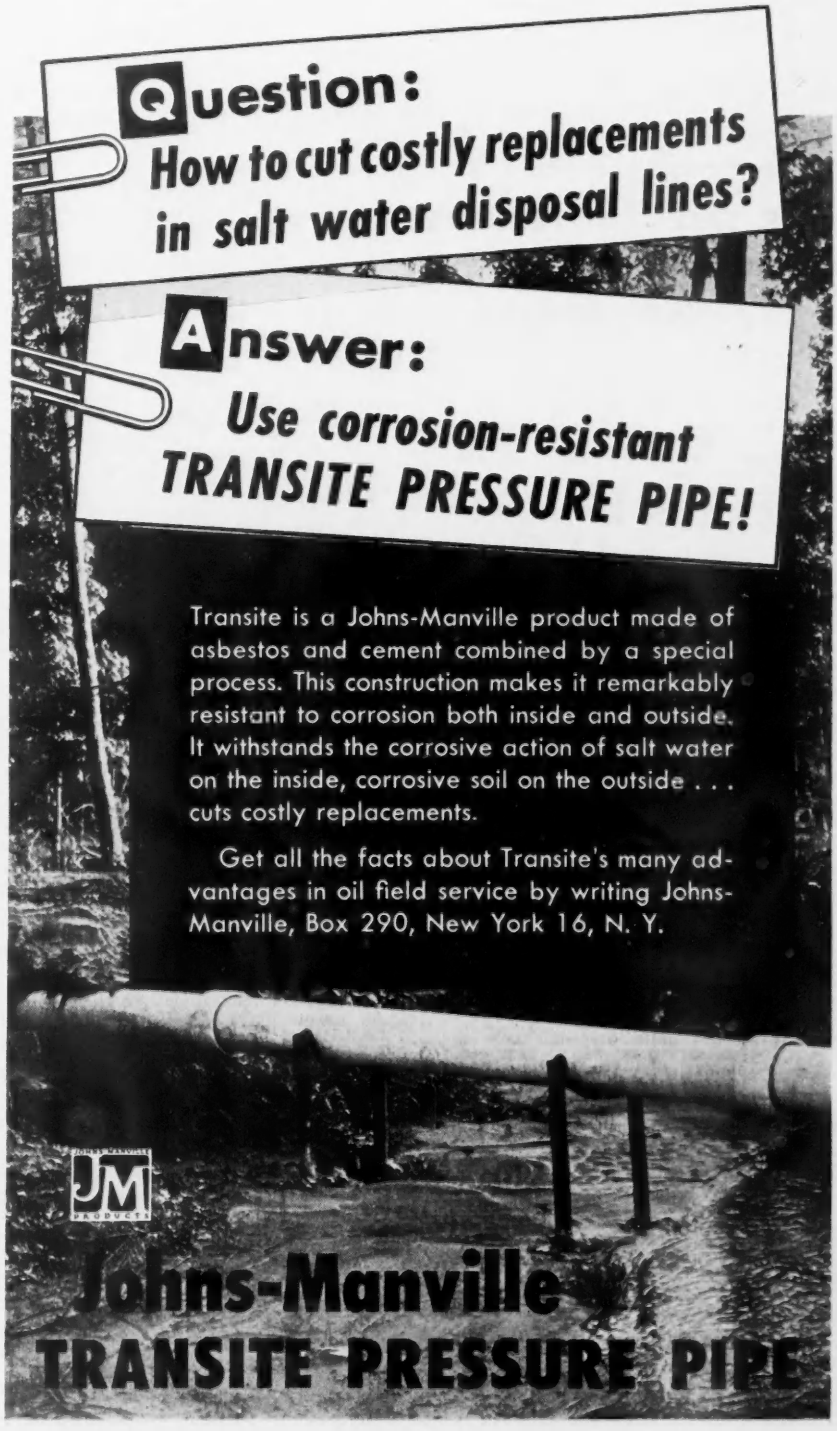
• Rocky Mountain Area

Wyoming Wildcat Has Water In Lakota, to Try Dakota

Fremont County, Wyoming, wildcat finds water in Lakota and plugs back to Dakota; Alkali Butte deep test probably will be abandoned; Church Buttes tests reported to be in Dakota; Pure's Worland Unit well has good recoveries in Third Frontier; Rangely field, Colorado, east extension try being abandoned.

Wyoming

General Petroleum Corporation's wildcat at Antelope, on the north side of the Red Desert Basin, found water in the Lakota horizon and has been plugged back. The well is 45-25-G, NE NE SW 25-27N-94W, Fremont County, and was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■ ATTENTION — FISHERMEN - HUNTERS! Reservations for summer fishing parties and fall hunting parties are now being booked in the heart of the Jackson Hole country of Wyoming. Superior trout fishing, big game hunting, moose, grizzly and elk. Pack trips, etc. Landing facilities. Write Col. Marshall Purvis, C Heart C Ranch, Bondurant, Wyoming.

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P. O. Box 75 Houston 1, Texas

■ PRESSURE GAUGES, NEW, individually packed in factory cartons— guaranteed.
120—Ashcroft #1079E, 4½" face, ICBR, Steel Tube, ½" connection, Each $9.50
Lots of 24, each.....$8.50
392—Clapp Instrument Company #400, 4½" face, Phenol Case, stainless steel tube, welded, ½" connection, each.....$9.00
Lots of 24, each $8.00
254—Ashcroft #1279E, 4½" face, Phenol Case, steel tube, ½" connection, each....$10.00
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Prices f.o.b. shipping point.
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4300 Pershing Fort Worth, Texas.

FOR SALE

FOR SALE

2—Climax Engines — R-225 c/w Emsco Chain Drive Transmission and one Waukesha starting engine.
2—Buda Engines—JL-1335 c/w Compounding Unit and two Novo starting engines.
1—LeRoi Engine — RXIV — c/w LeRoi starting engine.
1—Emsco—Type "H" Reverse Clutch.
1—36" Parkersburg Hydromatic Brake—cradle mounted with Emsco multiple jaw clutch coupling and Emsco Fluid Level Control.
1—Emsco—Type NB-42 five sheave Traveling Block.
1—Ideal—8" Type "M" Swivel.
1—Ideal—6" Type "E" Swivel.
1—Set BJ—Type "B" 4½" to 10¾"—Tongs complete.
1—Baash-Ross—Type 2RS6—Kelly Bushing with 4½" rollers.

All items completely reworked and in first class shape.

M. ROSENBLOOM PIPE & SUPPLY CO.
3538 Mansfield Road, Shreveport, La.

FOR SALE

2—Complete rotary rigs with 94 foot masts and drill pipe. One with Cardwell drawworks with GAk Waukesha motors, Gardner-Denver Pump; one with unit rig drawworks with D-13000 caterpillar motors, Ideal C-150 pump.

The following additional equipment:
3700 feet 3½ OD drill pipe with Reid full hole tool joints.
3—4½ OD drill collars.
2—Overshot sockets for 3½ drill pipe.
1—Regan 5-sheave 100 ton crown 30" diameter sheave, 1" groove.
1—Regan 4-sheave 80 ton crown 30" diameter sheave, 1" groove.
1—American Well prospecting Co., 5-sheave, 125 ton crown, 36" diameter sheave, 1⅛" groove.

Complete information furnished upon request. All of above in good condition. Write or call **KIOWA DRILLING COMPANY,** 717 Union National Bank Building, Wichita, Kansas. Phone 3-8013.

HELP WANTED

■ WANTED—Field geologist and instrument man for surface mapping in west central Texas. Give full particulars and salary expected in first reply. P. O. Box 670, Fort Worth, Texas.

■ FOREIGN POSITIONS: Junior Engineers, Material Men, Material Accountant, Payroll Clerks, Field Auditors, Warehouse Clerks, Geologists, Draftsmen, Male Stenographer-Clerks, Diesel Mechanics. These positions and many more are now opened for experienced applicants. Prefer single men. Fee paid by employer. Mail your resume to: CHAS. J. LOVELESS PERSONNEL SERVICE, 508 MAYO BUILDING, TULSA, OKLAHOMA.

WANTED: Man to handle layout, writing and production of catalogs and sales literature for manufacturer of oil field equipment located in town of 40 thousand in eastern state. All replies treated confidentially. Please give age, experience and salary required. Reply to Box 44, c/o The Oil Weekly, Houston, Texas.

Experienced Compressor Salesman or Gas Engineer for Field Sales Work.
ALSO
Engineering Draftsman with Experience in Pressure Vessels
Structural and Mechanical Design
THE J. B. BEAIRD COMPANY, INC.
Shreveport, Louisiana

■ SALT WATER DISPOSAL ENGINEER, experienced. Major oil company, Oklahoma City. Prefer engineer with three years oil production and salt water disposal experience. Give full particulars, reply P. O. Box 48, The Oil Weekly, Houston, Texas.

drilled to 10,770 feet, in the Sundance formation. All sands have been reported hard and tight, but small shows of gas in cores of the Lakota encouraged the operator to run casing to 10,105 feet. On drill-stem test at 10,105-248 feet, open 8 hours, there was a blow of sweet gas in 2 hours with an estimated rate of 10,000 to 22,000 cubic feet daily. After 5 hours the gas flow ceased and 2669 feet of mud and water were found in the hole. After swabbing, the level remained constant at 3000 feet. The well has now been plugged back to 10,080 feet, inside the casing, and Dakota, topped at 10,050 feet, will be tested.

The first deep test of the Alkali Butte structure probably will be abandoned after velocity surveys are completed. The Texas Company has made extensive tests of this well, which was drilled to 7430 feet, total depth, in the Tensleep formation, but shows of oil in the Embar have not been commercial. The well is Unit 4, SW NE NW 1-33n-95w. Tensleep carried water, but drill-stem tests of the Embar saturated zones have all had high water percentages. The Alkali Butte field was discovered a number of years ago and has produced a small amount of oil from the Frontier formation.

HELP WANTED

FIELD GEOLOGIST

Foreign, aerial mapping, mainly reconnaissance but also indicated detail surveys. Approximately 5 years experience. Minimum salary $6000 plus allowances. Write to **The Atlantic Refining Co., Rm. 900, Box 7258, Philadelphia 1, Pa.**

GEOPHYSICISTS

PERMANENT LOCATION

WANTED — Experienced geophysicists, computers, and recorders by an expanding contract seismograph company in marine exploration. All inquiries held confidential.

Experienced draftsman for detail map work.

Inexperienced personnel with formal background in engineering, physics, mathematics, radio, radar, geology and allied sciences solicited.

State age, education, experience and status of availability in first letter.

AMERICAN EXPLORATION COMPANY
P. O. Box 555 S.L.I.
LAFAYETTE, LA.

SEISMOGRAPH SUPERVISOR

Eastern Venezuela. Party chief experience, to act as Company representative overseeing labor, technical and operating phases of contract party work. Minimum salary $6000 plus living allowances. Foreign experience and Spanish helpful. Write **The Atlantic Refining Co., Box 7258, Philadelphia 1, Pa.**

SITUATIONS WANTED

■ SECONDARY-RECOVERY ENGINEER—B. S. degree in petroleum production engineering; eight years active experience Oklahoma and Texas water-flood, repressuring, and pressure-maintenance operations; Core-analysis laboratory procedure and interpretation; reservoir analyses in connection with secondary-recovery development; preparation of statistical and technical reports for publication; considerable experience general production engineering; bottom-hole pressure, well productivity, gas measurement testing. Box 42, c/o The Oil Weekly, Houston, Texas.

■ MECHANICAL ENGINEER, 20 years experience with oil trade in designing and sales, desires to make connection with reputable manufacturing concern. Hold patents to keep company busy on saleable items. Address Box 50, c/o The Oil Weekly, Houston, Texas.

Uinta and Sweetwater Counties: The important tests being drilled by Mountain Fuel Supply Company at Church Buttes, in southwestern Wyoming, are reported in Dakota formation. Unit 2, NE NE NE 22-17n-112w, reportedly topped the Dakota at around 12,440 feet and Unit 3, NE SW NE 12-16n-113w, found Dakota at approximately 12,900 feet. Mountain Fuel has released no information on these tests, and no confirmation of tops is possible. The discovery well at Unit 1, which is 5 miles south of Unit 2 and 1 mile east of No. 3, topped the Dakota at 12,552 feet and was estimated good for more than 50 million cubic feet of gas open flow daily with 300 barrels of condensate. Accurate producation tests have not been made of the well. The well was a Dakota sand discovery a year ago. Operations in this field have been the most expensive in the Rocky Mountain Region, with costs for the discovery test at more than $600,000. Estimates for the last 2 tests are at more than $400,000 each. Unit 3 has established a new depth record for the Rocky Mountains.

Washakie County: The Pure Oil Company's fifth well on the Worland Unit has had good recoveries on tests in the Third Frontier formation and the well may be completed in that horizon. The well, in SE SE SE 24-46n-92w, is a 1-mile southeast extension. Third Frontier was topped at 7424 feet and on drill stem test 7458-76 feet the well made an estimated 4 million cubic feet of gas with 170 feet of 53-gravity condensate. Casing has been run to 7431 feet for further testing A dry hole at Unit 4 on the northwest side of the field has been drilled, and three producers have all been completed in the Embar formation at depths below 10,000 feet. Pure is now producing 700 barrels of 40-gravity oil daily from the field, and crude is processed in The Ohio Oil Company Lovell refinery and at Standard Oil Company of Indiana's Greybull plant.

Colorado

Delta Drilling Company of Tyler, Texas, and Mountain States Company of Denver, are abandoning an attempted east extension to the Rangely field at Kenney 1, SW NW SW 34-2n-101w, Rio Blanco County, 2½ miles east of Weber sand producer in the field. The well topped Weber at 6717 feet and was drilled to 6746 feet, total depth. On drill-stem test, 320 feet of mud and water were recovered in 20 minutes. This is the fifth dry hole in the Rangely Field.

Lion Oil Firm Establishes Rocky Mountain Offices

The Lion Oil Company has set up district geological and land offices at Denver, in its preparation to explore the Rocky Mountains area for new petroleum reserves.

From Denver the company will open a long-range program which may cover more than 600,000 square miles in Colorado, Wyoming, Montana, Utah, Idaho and northwestern New Mexico.

E. D. Klinger is head of the geological department, and has named A. W. Cullen as district geologist for the Rockies. Wayne C. Rauch, Lion employe for six years, will work with Cullen. R. T. Ellzey, head of the land department, has appointed C. D. Edmonson as landman for the area.

EXPLORATORY FAILURES

ARKANSAS WILDCATS

Lonoke County: C. A. Mohkern, Tr.'s L. B. Heffner 1, c ne ne ne 35-4n-9w, Paleozoic 605, abnd 5-2-47 at 635.

Miller County: Don Fitzwater et al's G. G. Crank 1, sw 36-15s-26w, 3 mi e Garland City fld, Tokio 2790, abnd 5-2-47 at 2910.

CALIFORNIA WILDCATS

Kern County: Pacific O&G Dev. Corp.'s C.C.M.O. 85-22, 22-25s-27e, Jasmine area, abnd 5-4-47 at 2754.

Los Angeles County: Vincent F. Stabeck's Knapp 3, 4-1n-17w, Canoga Park area, abnd 5-3-47 at 235.

Solano County: Amerada's McGinsey 1, 5-6n-2e, Dixon area, abnd 5-7-47 at 5000.

Yolo County: Standard's Campbell Community 1, 18-8n-2e, Davis area, abnd 5-3-47 at 5000.

COLORADO WILDCAT

Montezuma County: Jack Harris' Gov't. 1, c ne¼ 22-35n-15w, Mount Lookout, Dakota 751, abnd 5-1-47 at 935.

ILLINOIS WILDCATS

Clark County: Clarence Fitzgerald's Montgomery 1, nw nw nw 10-11n-13w, abnd 712.

Clinton County: Paul Mosebach's Meyer 2, nw nw sw 18-1n-3w, abnd 2520.

Effingham County: Inland Oil Co.'s Hoene 1, nw sw sw 35-9n-6e, abnd 2465.

Jasper County: A. J. Slagter, Jr.'s Bank of Newton 1, ne sw sw 10-5n-10e, abnd 2946.

White County: Puritan Drlg. Co. et al's Wilson 1, ne nw ne 24-5s-8e, abnd 3303.

INDIANA WILDCATS

Gibson County: George & Wrather's Blood 1, nw se se 14-3s-13w, abnd 2405.

E. A. Gabriel's Fleenor 1, se nw sw 22-3s-12w, abnd 2720.

Posey County: Vic & Van Operating Co.'s Rickens 1, 12-5s-14w, abnd 3134.

KANSAS WILDCATS

Barton County: Derby Drlg. Co.'s Phillips 1, ne ne sw 12-16s-13w, abnd 3420.

Graham County: Palmer Oil Co.'s Roberts 1, nw nw nw 34-8s-21w, abnd 3739.

Greenwood County: Sam Molter's Zebold 1, nw sw nw 10-24s-8e, abnd 2600.

Pratt County: Lion Oil Co.'s Bales 1, nwc 18-26s-13w, abnd 4532.

Rice County: Westgate-Greenland Oil Co.'s Gill 1, sw sw ne 9-19s-10w, abnd 3391.

Rooks County: Aylward Prod. Co.'s Yeagy 1, sw sw sw 35-9s-18w, abnd 3711.

KENTUCKY WILDCAT

Henderson County: Ashland O&R Co. et al's Latta 1, 14-P-21, abnd 2793.

NORTH LOUISIANA WILDCAT

Union Parish: Shell's Frost Lbr. Co. 3, sw se 31-23n-3e, abnd 4-29-47 at 2830.

Shell's Frost 4, se nw 11-21n-2e, abnd 5-5-47 at 3280.

NORTH LOUISIANA NEW PAY TEST

Webster Parish—Cotton Valley Field: Cotton Valley Operators' Comm.'s Sam Banks 2, (OWDD) c se nw 34-21n-10w, "D" sd 8123-40, Bodcaw 8220-37, Davis 8462-72, Bossier shale 9118, Smackover 10,325, otd 5792, td 14,967, pb 8500, perf 8458-92, flow 230 bbls dist, ¼-in, gor 22,500/1.

SOUTH LOUISIANA WILDCAT

Rapides Parish: Lynn Oil Co.'s Perry 1, 660 n 510 w of sec 5-4n-3e, 2½ mi nw Big Island fld, abnd 4-28-47 at 10,011.

MISSISSIPPI WILDCATS

Forrest County: Superior's Maria Draughon 1, nec 12-3n-13w, abnd 5-2-47 at 10,281.

Issaquena County: Sun-C. H. Murphy, Jr.'s M. T. Reed 1, nwc 27-10n-8w, Wilcox 2054, gas rock 3720-28, Tuscaloosa 3728, abnd 5-4-47 at 4096.

Wayne County: S. P. Borden's W. A. Robinson 1, nwc se nw 26-7n-7w, Eutaw 6146, Tuscaloosa 6146, Massive sd 7242, abnd 5-6-47 at 7510.

MONTANA WILDCAT

Pondera County: C. W. Stephens' Venetz 1, ne ne se 29-27n-3w, E. Pondera, Sunburst 1685, Ellis-Madison 1977, abnd 5-5-47 at 2035.

NEW MEXICO WILDCATS

Chaves County: DeKalb Agricultural Assn.'s Cannon 1, nw ne sw 27-10s-25e, abnd 4-18-47 at 450.

DeKalb Agricultural Assn.'s Cannon 1-X, 2307 nsl 1654 ewl 27-10s-25e, abnd 4-30-47 at 240.

OKLAHOMA WILDCATS

Comanche County: Akory & Cower's Carothers 1, nw nw ne 27-2n-11w, abnd 683.

Cotton County: Snoddy Brothers' Staley 1, sw sw sw 12-4s-10w, abnd 2010.

E. P. Griffin's Ballard 1, se nw nw 15-4s-12w, abnd 1750.

Hughes County: Donald T. Ingling's Hall-Ryan 1, sw sw nw 15-9n-10e, abnd 3220.

Kingfisher County: Continental et al's Borelli 1, c nw se 4-16n-5w, abnd 7372.

Lincoln County: Danciger O&R Co.'s State 1, sw se nw 16-12n-5e, abnd 5207.

Logan County: Ray P. Diehl's Rutledge 1, c ne nw 8-17n-3w, abnd 4957.

McIntosh County: J. M. Young et al's Fee 1, nw ne ne 11-11n-18e, abnd 1250.

Osage County: Marvin Marrs et al's Huston 1, sw sw ne 15-22n-7e, abnd 3960.

Seminole County: B. C. Deardorf's Murray 1, se se nw 15-11n-8e, abnd 4164.

WEST TEXAS WILDCATS

Garza County: Anderson Bros-Geo. McQueen & Clevenger's Henderson 1, nw nw nw H&GN 47, blk 6, elev 2298, salt 728, Yates 964, San Andres 2050, abnd 5-9-47 at 2548.

T. C. Huddle et al's Sanders 1, 2137 nsl 2173 ewl E.L. & R.R. 1233, anhydrite 990, San Andres 2490, abnd 5-8-47 at 3227.

Mitchell County: Cosden Pet. Corp.-J. B. Tubb's Jones 1, ne ne se L. N. Ry. 60, blk 20, elev 2314, Yates 1025, brown lI 1979, San Andres 2045, Glorietta 2845, Clear Fork 3032, abnd 5-2-47 at 5922.

Tom Green County: Wm. W. Gruber-H. A. Ringle & J. S. Dennis' Braden 1, sw se ne S.P. Ry. 90, Dist. 11, elev 1835, Cisco 2110, abnd 5-3-47 at 2205.

NORTH CENTRAL TEXAS WILDCATS

Coleman County: West Central Drlg. Co. et al's McCord 2, 330 snl 1718 wel of s½ sect 16, J. H. Gibson sur, abnd 4-24-47 at 3863.

Jones County: Harry Hines and Hilburn's Young 1, 1100 wel 6700 snl D. Bustillo sur 189, elev 1627, abnd 5-3-47 at 2305.

Carl Hovgard et al's Ramsey 1, 990 ewl 1650 snl n½ sect 13, Blind Asylum Lands sur, elev 1711, abnd 5-3-47 at 1846.

B. G. Byars et al's Cox 1, sw sw sw MEP&P Ry. 9, elev 1771, abnd 5-1-47 at 2964.

Fain & McGaha's Cauble 1, 330 out sec sbdn 8, Mary Lawson sur 5, elev 1640, abnd 5-4-47 at 1883.

Fain & McGaha's Pruitt 1, 330 out nwc sbdn 6, C. Allen sur 10, elev 1625, abnd 5-6-47 at 1895.

C. C. French et al's Reynolds 1, 2700 fr m/s/nl 2950 fr m/e/wl of C. & M. sur 3, elev 1590, abnd 5-3-47 at 2082.

Throckmorton County: Panhandle Ref. Co.'s Spain 1, 467 nsl 1866 ewl sect 931, TE&L Co. sur, elev 1318, Mississippi 4754, abnd 5-6-47 at 4788.

NORTH TEXAS WILDCATS

Archer County: Wm. G. Gouchie et al's Abercrombie 1, 150 nsl 450 ewl sect 110, blk 4, Clark-Plumb sur, abnd 4-25-47 at 1225.

Cooke County: O. M. Fine-J. J. Hull's Trubenbach 1, 990 out nec lot 3, Wm. Slingman sur, abnd 4-15-47 at 2018.

R. B. Hollandsworth-Geo. Brimmer & Nutting's Otto 1, 2700 ewl 1000 snl N. J. Lewis sur, abnd 4-29-47 at 1708.

Montague County: H. D. Egger's Womack 1, 611 nsl 750 wel E. A. Walker sur, abnd 4-26-47 at 2005.

Young County: Lloyd Oil Co.'s Graham 1, 330 fr nwl swl Ben Bragg sur, abnd 4-25-47 at 3470.

NORTH TEXAS WILDCATS

Cooke County: Seitz-Comegys & Seitz's Bush-Standard of Texas 1, 1036 nsl 330 ewl A. Livingston sur, elev 771, Bruhlmeyer sand 2442, Ellenburger 4974, abnd 5-6-47 at 5013.

Jack County: Continental's Moore 1, 2900 nsl 1800 wel T. H. Jurdston sur, elev 941, Strawn 1840, Bend 4924, Marble Falls 5445, Barnett 5872, Ellenburger 6139, abnd 4-30-47 at 6229.

Young County: Gearhardt Jeske's Jeske 1, 1400 nsl 1600 ewl sec 189, TE&L Co. sur, abnd 5-1-47 at 1230.

SOUTH CENTRAL TEXAS WILDCATS

Atascosa County: Eugene W. Gill's D. C. McAda 1, 187 ne alg nwl Alfred A. Lee sur fr e bank of Atascosa River, th 330 se at ra to lcn, Wilcox 2950, abnd 5-4-47 at 5810.

Guadalupe County: Wiegand Bros.' Pat H. Baker 1, 330 fr sel 6000 fr swl U. Wakerfield and C. B. Stewart sur, abnd 5-3-47 at 2540.

MIDDLE TEXAS COAST WILDCAT

Bee County: W. Earl Rowe et al's J. V. Ellis Est. 1, 330 fr el 1630 fr n or nely of m/nly portion Washington Stephens sur, 354-ac lse, 5600 n alg wl fr swc W. Ryan sur, abnd 5-4-47 at 4210.

SOUTHWEST TEXAS-LOWER COAST WILDCATS

San Patricio County: Republic Nat. Gas Co.'s J. B. Hardwicke 1, (OWDD) 330 fr swl 128 fr sel blk 48, Wedler & Odem sbdn, 465-ac lse, abnd 5-2-47 at 7856.

Southern Minerals Corp.'s Katherine Clifton 3, 330 fr nel 4200 fr nwl 9412-ac lse, Jas. B. Wilson sur, abnd 4-30-47 at 4738.

UPPER TEXAS COAST WILDCATS

Chambers County: Standard of Texas' State-Galveston Bay 2-80, 660 fr nw&swl 939-ac lse, sect 80, Galveston Bay, 1 mi w Mayes fld, abnd 4-29-47 at 8344.

Wharton County: Oil Drlg.'s Chas. D. Putnam 1, 330 fr s&wl sect 48 WRCC, sur, 152-ac lse (Peter Hahn sur), abnd 4-24-47 at 5209.

Notice

To Owners of Producing Oil Properties

Would any of the following sound reasons for selling part or all of one's producing oil properties at this time apply to you?

1. **To make ample provision, while living, for inheritance and estate taxes, thus eliminating the necessity of forced and, perhaps, untimely or inexpert liquidation of properties, by executors, when such properties might even be appraised by the Government at a much higher price than they could be liquidated for.**
2. **To take advantage of the tax on capital gains, which is limited to 25%, as compared with higher income taxes on current profits.**
3. **Because of advancing age or health considerations.**

We are desirous of negotiating immediately for cash purchase of the operating interest in producing and proven oil properties, in an amount or amounts up to a total of ten million dollars. Write, wire, or telephone Walter S. Sachs, President,

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Ralph B. Roark

W. A. Alexander

Ralph B. Roark, vice president of Shell Oil Company, Inc., Tulsa, will retire on July 1 due to ill health, and will be succeeded by **W. A. Alexander,** the area manager at Houston. Roark has been with the company 29 years, and has headed its Mid-Continent division since 1937. **Sherwood Buckstaff,** manager of the exploration department, will be transferred to the regional staff at Houston, and **R. E. McAdams,** district geologist representing the Tulsa area on the regional staff at Houston, will take Buckstaff's place.

»

G. Maynard Boos, formerly Rocky Mountain division geologist with Barnsdall Oil Company, has accepted a position with Geophoto Services, Inc., of Denver.

»

Major B. A. Hardey, IPAA president, will talk on "Why We Need a Healthy and Solvent Domestic Petroleum Industry" at the East Texas API meeting May 21 in Kilgore.

»

Tom Grisham, Abilene producer, was elected president of the West Central Texas Oil & Gas Association, succeeding **Jack Robert** of Breckenridge. **M. G. Cheney,** head of the Anzac Oil Corporation, Coleman, and **M. K. Graham,** Graham, were chosen first and second vice presidents, respectively.

»

G. W. Gulmon and **N. W. Johns,** geologists with The California Company for eight years, have resigned to open consulting offices in Natchez, Miss.

»

R. Clare Coffin, geophysical coordinator of Standolind Oil & Gas Company, Tulsa, was elected president of the Tulsa Geophysical Society. Other officers include **Dr. A. B. Bryan,** chief geophysicist, The Carter Oil Company, and **H. M. Thralls,** chief geophysicist for Seismograph Service Corporation, vice presidents, and **Francis F. Campbell,** geophysical supervisor of Amerada Petroleum Corporation, secretary-treasurer.

»

W. K. Warren, president of Warren Petroleum Corporation, Tulsa, has been elected to the board of directors of the Missouri-Kansas-Texas Railroad for a two-year term. **L. H. Prichard,** president of Anderson-Prichard Oil Corporation and Coltex Refining Company at Oklahoma City, was elected for a one-year term.

E. C. Overbeck, one of two new vice presidents of Ohio Fuel Gas Company, was placed in charge of plant operations, which will include production, transmission, and certain phases of distribution. Overbeck has been associated with the gas industry for 34 years, starting as a well tender in northern Ohio for Ohio Fuel Supply Company.

»

John T. Ashford, vice president of Associated Engineers, Inc., has been transferred from the Houston headquarters to Midland, Texas, where he will be in charge of West Texas operations.

»

P. R. Smith, chief scout for The Pure Oil Company in the Tulsa area since 1933, retired May 15 with a service record of 27 years. Before going to Tulsa he was manager of the Arkansas division and assistant manager at Ft. Worth. **Jack D. Linder** will succeed him as chief scout at Tulsa. He has been with Pure since 1936 and has been assistant division land agent since June, 1944.

»

J. Harry Reynolds, West Central Texas producer and oil equipment manufacturer, is president of the Lee Geophysical Exploration & Research Corporation, Delaware chartered firm that has been given permit to operate in Texas. The company is capitalized at $150,000, and operating headquarters are in the Reynolds building, Cisco, Texas.

David B. Harris

J. A. Neath

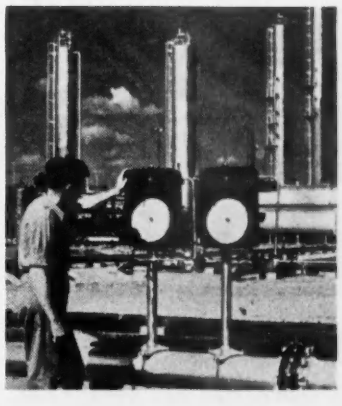
David B. Harris, treasurer, and **J. A. Neath,** a director, were elected vice presidents of Humble Oil & Refining Company. Harris will retain the post of treasurer in addition to his new duties. He has been with the firm since 1919, when he joined the firm as a laborer. Neath was a vice president of Humble Pipe Line Company before becoming a director of Humble Oil & Refining Company. He went to work for Humble in 1919 as a district foreman.

»

J. C. Donnell, II, of Findlay, Ohio, was elected president of the Mountain Fuel Supply Company at the annual company meeting in Salt Lake City. **T. B. Gregory** of Pittsburgh, Penn., was elected chairman of the board, and **W. T. Nightengale,** Rock Springs, Wyo., was made vice president.

ENGINEERS WHO KNOW

FLOWMETER OPERATION



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Walter W. Fowler, vice president in charge of exports for General American Transportation Corporation, has been elected a director.

»

M. W. Reed was elected vice president in charge of engineering for Carnegie-Illinois Steel Corporation. He has been chief engineer since 1939. Previously, he was vice president in charge of operations of the American Steel and Wire Company, another U. S. Steel subsidiary.

Brison Wood has been elected treasurer of the Minneapolis-Honeywell Regulator Company, succeeding **Willard L. Huff,** who has been serving as executive vice president and treasurer. Huff will continue as a director of the company and executive vice president. Wood joined Minneapolis-Honeywell in March of 1942 to assist in expediting war production, was elected assistant secretary and assistant treasurer the following year, and held these positions until his election to treasurer.

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Expert oil country machinists, using top-quality materials, grind and finish JP Rods and Liners to precision standards. In addition—each and every JP Rod and Liner is "hardened" by a patented process and individually inspected to approximately 600 (or better) Brinell test.

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J P Machine & Tool Company

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Charles B. Gannaway, Jr., plant manager for Tulsa Boiler & Machinery Company, was installed as president of the Engineers Club of Tulsa, succeeding **H. M. Cooley,** Bethlehem Steel Company. Other officers installed are: **E. M. Newland,** Oklahoma Steel Castings Company, executive vice president; **J. Murray Walker,** Lane-Wells Company, treasurer; **M. J. Myers, Jr.,** Public Service Company of Oklahoma; **Raymond M. Carr,** Sinclair Prairie Oil Company; **Robert G. Smith,** General Electric Company; and **Lloyd E. Elkins,** Stanolind Oil & Gas Company, vice presidents; and **D. E. Foster,** Bethlehem Supply Company, secretary. Directors installed include Cooley; **F. W. Robson,** The Happy Company, and **T. D. Williamson, Jr.,** T. D. Williamson Company.

C. B. Gannaway, Jr.

»

Lou G. Cornish, supervisor with Seismograph Service Corporation, is being transferred from Tulsa to Lafayette, La., where he will join American Exploration Company, a recently acquired subsidiary. Cornish is the vice president in charge of interpretation of over-water seismic prospecting. Cornish joined Seismograph Service Corporation at the time of its organization in 1931, making him the company's oldest employe in point of service. While with the parent company, he worked up through the positions of shooter, surveyor, computer, party chief and supervisor.

»

J. A. LaFortune, vice president of Warren Petroleum Corporation, Tulsa, was named a director of the Public Service Company of Oklahoma. He has been with the Warren corporation since 1934.

»

W. A. Eardley, since 1943 supervising petroleum engineer in the San Francisco office of Standard Oil Company of California, has been appointed chief petroleum engineer in the company's producing department. He succeeds **E. G. Gaylord,** who recently was elected a vice president and director of California Research Corporation, a subsidiary. Eardley joined Standard in 1926 following his graduation from Stanford University. He since had served as petroleum engineer in Southern California and in the company's home office in San Francisco.

W. A. Eardley

W. J. Brady, representative for Bethlehem Supply Company at Houston, has been promoted to district manager of the Southwest Texas District, with headquarters at Corpus Christi. He became affiliated with the company at Tulsa in 1939 and has served in various capacities with Bethlehem at Tulsa, Wichita Falls, Amarillo and Houston. Prior to his connection with Bethlehem, Brady had ten years of experience in the supply business.

W. J. Brady

»

Jesse Price, formerly tool pusher with Colombian Petroleum Company, has become drilling superintendent of the Colombian division of Texas Petroleum Company. Texas Petroleum Company employes recently arrived in Colombia from the U. S. include **Bob Simmons,** driller, of Beaumont, Texas; **M. L. Hall,** petroleum engineer of Edinboro, Penn.; **E. L. Calender** of Houston, road construction foreman; **D. E. Spoonts,** driller, of San Angelo, Texas; and **Odie H. Arnold** of Los Angeles.

George F. Scheiber recently arrived in Colombia from the Canal Zone to take over operation of camp and commissary facilities in the Pinto Nino district of Texas Petroleum Company.

»

George M. Conner, formerly assistant parts manager of the Diesel Engine Division of Stewart & Stevenson Services, 4516 Harrisburg, Houston, has been promoted to parts manager of the Houston plant.

Ivan F. Baker has been elected vice president of the Westinghouse Electric International Company. He has been treasurer since 1945, a post he retains along with that of director of the company.

»

G. H. Hopewell of London has been appointed managing director of Foster Wheeler, Ltd. **H. Fothergill** will continue as chairman of the board.

Deaths

Frank Alberts, 72, Tulsa, retired general superintendent of the old Darby Petroleum Corporation, died May 9. He was a native of Emlenton, Penn., and had served with the old Valley Osage Oil Company and Sinclair Oil Company. He retired from Darby when that firm merged with Sunray Oil Corporation.

»

R. J. Nelson, 47, assistant pipe line superintendent for Mene Grande Oil Company in eastern Venezuela, died May 13 in New York City. Nelson joined Gulf Oil Corporation in Mexico on August 1, 1920, in Mexico, and a few years later was transferred to the pipe line department in Venezuela.

William H. Pomeroy, 65, pioneer Tulsa oil man, died at Midland, Texas, May 9. He was an organizer and member of the firm of Pouder & Pomeroy, Tulsa, and had lived in Oklahoma since 1904.

»

Clinton Garfield Lowry, 66, Seminole, Okla., retired employe of Gulf Oil Corporation, died May 5. He joined Gulf in 1915 and retired in 1946.

»

J. R. Battenfield, 59, president of Battenfield Oil & Grease Corporation, died in Kansas City May 7.

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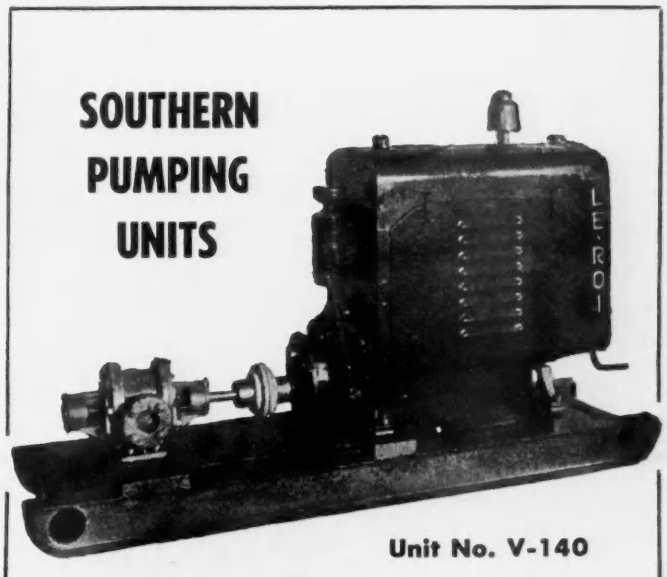
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Appointments to IDECO Sales Organization Are Announced

Appointments to the IDECO sales organization have been announced by T. D. Collins, vice president, International Derrick and Equipment Company.

Fred Knieff has been appointed city representative in Dallas and will have headquarters in the IDECO Building, Dallas.

Arthur H. Knight has been appointed machinery representative for Oklahoma and Kansas with headquarters in the Kennedy Building, Tulsa.

P. M. Kovack has been appointed sales representative at Fort Worth and will have headquarters in the Commercial Standard Building.

Don Shaw has been appointed machinery sales engineer for Texas, Louisiana and Mississippi with headquarters in the IDECO Building, Dallas.

Cummins Named Board Chairman, Miller President of Engine Firm

C. L. Cummins, founder of Cummins Engine Company, Columbus, Ind., was elected chairman of the board of directors, and J. I. Miller was elected president of the company at the annual meeting of stockholders and directors.

Cummins established the firm in February, 1919, to build what was then called "the Cummins Oil Engine." At the time of its founding, the firm employed fewer than 20 persons, whereas now there are more than 2000.

Early years of the company were devoted chiefly to experimentation, with only a few engine models being produced. In 1930, Cummins drove from Indianapolis to the auto show in New York in an automobile powered by the first practical automotive diesel. Two years later, he drove a 32-passenger Cummins-powered bus from New York to Los Angeles in 76 hours and 10 minutes at a total fuel cost of only $21.90.

Miller joined the company in 1934 as vice president and general manager and has served continuously except for the years 1942-44, when he was a commissioned officer in the Navy.

Other officers elected are V. E. McMullen, executive vice president; R. E. Huthsteiner, vice president and general manager; H. L. Knudsen, vice president of engineering; Carl R. Fox, vice president and works manager; D. C. Bottorff, secretary and treasurer; R. E. Lay, assistant secretary and assistant treasurer, and Edwin G. Crouch, assistant secretary.

Bethlehem Supply Names Manager For New Store at Beaumont

R. C. Repp, Bethlehem Supply Company, has been named store manager and field representative for the company's new store in Beaumont, Texas. He has been with the firm at Houston since 1944, having previously been employed by the Houston Shipbuilding Company.

R. C. Repp

A. V. Wafer has been appointed special representative at Beaumont, to handle refinery supplies.

The store is an addition to Bethlehem's Gulf Coast district, under general supervision of O. H. Crowe, district manager at Houston.

Opening of Four Stores Announced By Mid-Continent Supply Company

Mid-Continent Supply Company has opened the following stores:

Great Bend, Kansas, with V. H. Haston, store manager, and Paul K. Confer, field salesman; New Iberia, La., with W. R. Shuffield, store manager, and H. M. LeCompte, field salesman; Brookhaven, Miss., with W. M. Day, store manager, and C. R. Lowry, field salesman; Pauls Valley, Okla., with Paul Myers, store manager, and D. B. Afflack, field salesman.

Instrument Conference Set

Highlighted by 30 technical discussions and 120 instrument manufacturers' exhibits, the Second Instrument Conference and Exhibit will be held at the Stevens Hotel, Chicago, September, 8-12, 1947.

Sponsored by the Instrument Society of America, the meetings and other educational lectures will be held in the hotel's meeting rooms. About 10,000 instrument engineers and instrument men, and others, are expected to attend.

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946

Of The OIL WEEKLY, published weekly at Houston, Texas, for October, 1946.

State of Texas, County of Harris, ss:

Before me, a Notary Public in and for the State and County aforesaid, personally appeared A. L. Burns, who, having been duly sworn according to law, deposes and says that he is the Business Manager of The OIL WEEKLY and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily, weekly, semiweekly or triweekly newspaper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the act of August 24, 1912, as amended by the acts of March 3, 1933, and July 2, 1946 (section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are: Publisher, Ray L. Dudley, 3371 Chevy Chase, Houston, Texas; Editor, Warren L. Baker, 1631 Woodhead, Houston, Texas; Managing Editor, Silas B. Ragsdale, 1636 North Blvd., Houston, Texas; Business Manager, A. L. Burns, No. 7 Chelsea Place, Houston, Texas.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

The Gulf Publishing Company, Houston, Texas; James Anderson, Houston, Texas; A. L. Burns, Houston, Texas; James F. Carter, Jr., Tulsa, Okla.; Mrs. Mary Margaret Cashman, Houston, Texas; Mrs. Carolyn Dodson Dudley, San Angelo, Texas; Estate of Dr. N. L. Dudley, Deceased, Houston, Texas; Ray L. Dudley, Houston, Texas; Estate of W. S. Farish, Sr., Deceased, Houston, Texas; Wm. V. Gross, Utopia, Texas; Mrs. Anita S. Lane, Houston, Texas; Chas. H. Lane, Houston, Texas; Tom W. Nelson, Houston, Texas; Wallace E. Pratt, Carlsbad, N. M.; J. Kent Ridley, Houston, Texas; Mrs. Maude G. Sterling, La Porte, Texas; R. P. Swinsky, Houston, Texas; O. R. Waller, Chicago, Ill.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is 14,168. (This information is required from daily, weekly, semi-weekly, and triweekly newspapers only.)

A. L. BURNS, Business Manager.

Sworn to and subscribed before me this 6th day of May, 1947.

P. J. AUCOIN,
(Seal) Notary Public in and for Harris County, Texas
(My commission expires June 1, 1947.)

SQUEAKS from the BULL WHEEL

The Modern Way

Mother: "Don't you think Junior should know a little bit about the facts of life? Why don't you tell him about the birds and bees?"

Father: "Okay. Now, Junior, I guess you know a thing or two about how babies get here, don't you?"

Junior: "Gosh, yes, Pop. I've known about that for years."

Father: "Well, son, it's the same way with the birds and bees."

Poet's Nook

'Twas just the other evening
In a fortune-telling place,
A pretty gypsy read his mind
And then she slapped his face!

Encore

A young theologican named Fiddle
Refused to accept his degree;
"It's bad enough to be Fiddle
Without being Fiddle D.D."

Short, Short Story

"Every great short story," said the journalism professor to his class, "should have reference to the Deity, a touch of royalty, and some mention of sex."

Next day a student handed in a story that started like this: "My God," cried the princess, "take your hand off my knee!"

There Comes a Time

The guest of honor was seated across the table from a lady wearing one of the latest, strapless, clinging types of evening dress. Despite the conversation of his two charming neighbors, the guest could not keep his eyes from the contours revealed and suggested, and finally he leaned across the table to address the lady.

"Pardon me, madam," he began, "I just had to ask you what keeps that dress up."

"Just two things," she replied, "your age—and my discretion."

The Woman's Way

"Have you heard the story that's going around about Minnie?"

"Heard it? Dearie, I started it."

Hints for Householders

When your mind makes a contract
The rest of you can't fulfill,
Then you're over the hill, boy,
You're sure over the hill!

Another Problem Solved

"When are you going to stop chasing women?"

"When they stop running."

Sold

"Are you absolutely sure that stuff will grow hair?"

"Am I sure, he says! Why, my dear sir, do you see this hair brush? Until some of this hair-grower got spilled on it last week, it was just a ping pong paddle."

A Jolt Either Way

The fact of the matter
Is, stealing a kiss,
You'll either be getting
A hit or a Miss.

Fun at Home

"For the life of me," said the fellow in an argument on the evolution of man, "I can't see what difference it would make to me whether my grandfather was an ape."

"Right you are. But it must have made a great difference to your grandmother."

Dry Hole

"Is there any chance for a young man to start at the bottom and work up in this business?"

"Not much. We're drilling contractors."

This Curious World

A bachelor is a fellow who never makes the same mistake once.

A girl's last line of defense: "The folks will be home any minute now, George."

To a stenographer, quitting time is when somebody knocks on the door of her boss' office.

A beach is a place where people lie on the sand . . . about how rich they are.

Girls want a lot these days—and some of them even want a house on it, too.

OWEN

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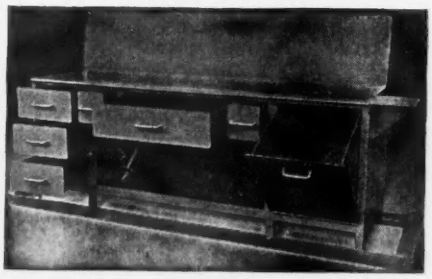

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